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STEEL

ESTABLISHED 1882

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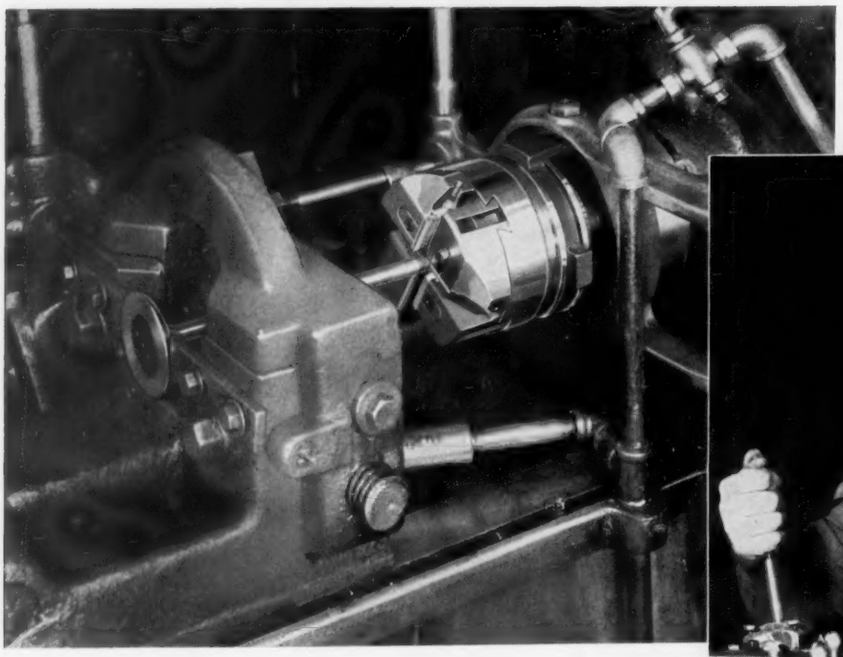
PRODUCTION • PROCESSING • DISTRIBUTION • USE

Industry's Accurate Threads are Produced with **LANDIS** *Hardened and Ground* **Heads**



Above, a LANCO Head threading motor valves. The thread is ½″ in diameter—20 Pitch N.F. 1½″ long. Material—3140 S.A.E. steel. One hundred threads are produced per hour with only an allowable limit of .0015″ on pitch diameter. Five hundred of these valve stems are threaded per grind of the chaser.

On the right, a LANDMATIC Head threading tail wheel knuckles for airplanes. The thread is 9/16″ in diameter—18 Pitch N.F. ½″ long. The permissible tolerance of .003″ was easily maintained, and the actual threading time reduced 50% since only one cut was required per thread. (Because of the extremely close inspection of these parts two cuts were required to obtain results prior to using the LANDMATIC Head.)

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Write for Bulletin No. F-80, today

LANDIS MACHINE CO., Inc.
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STEEL
PRODUCTION • PROCESSING • DISTRIBUTION • USE

As the Editor Views the News

■ STEEL production last week (p. 24) again moved upward slightly and now stands at 94 per cent of ingot capacity. Reaffirmation of present prices on most steel products for the next quarter (p. 87) has had little effect on demand for either current or future shipment. Some steel mills still are receiving new orders faster than they are shipping steel, despite operating at capacity. With Chrysler plants reopened, December will be the heaviest month in nearly two and a half years in automobile assemblies. But the peak in steel orders has passed and additional business will be needed to maintain the present steelmaking rate indefinitely. Mills now are more disposed to accept export business and already have reduced prices on bars and plates for export.

• • •

One of the issues in the Chrysler strike (pp. 37 and 42) was whether the CIO would sit on both sides of the collective bargaining table, through unionization of foremen and supervisory officials. The strike, incidentally, cost the men more than twenty-seven million dollars in lost time. . . . In return for granting the closed shop and checkoff, Pittsburgh Tube Co. is authorized by SWOC (p. 29) to discharge any employe guilty of interfering in any way with the orderly operation of the company's business. . . . Germany continues to ship steel to neutral countries at unchanged prices (p. 87) and intends to fulfill a large contract for railway equipment (p. 34) for Chile. . . . Federal trade commission accuses the compressed air industry (p. 27) of eliminating competition.

"Authorize" Company

• • •

Canada is stepping up expenditures for war purposes (p. 23); the really big orders have not yet been placed. The dominion is planning for a 3-year war. . . . Some discussion is heard at Washington (p. 32) over the administration's recent inference about expanding steelmaking capacity on the West Coast; as yet the project appears highly nebulous. . . . Finance committee of the United States chamber of commerce has submitted to the treasury department (p. 32) its tax revision recommendations. . . . October exports of iron, steel and machinery (p. 28) showed substantial gains. The war is making some changes in the pattern of our export trade. . . . Scrap (p. 104) continues in a bear market. . . . Lake iron ore shipments in 1939 (p. 105) aggregated a little more than 45,000,000 tons.

Nebulous Project

• • •

A new stitching machine (p. 79) drives wire through 0.060-inch steel. . . . Operations are to be resumed (p. 79) at a Tennessee manganese ore mine idle since the World war. . . . Blast furnace is completely and inexpensively cleaned by the recently developed method of washing by stationary disintegration (p. 50), using spiral passage moisture eliminators. . . . Production of baked varnish-coatings on steel sheets for electric motor laminations has been doubled and quality improved (p. 54) through installation of a synchronized sheet slitter, varnish applicator and conveyorized flash-baking oven. . . Advanced press shop technique (p. 46) makes it possible to form front fender and shroud, hood side and headlamp shell for 1940 Buicks in one integral unit.

Stitching Steel

• • •

A new dictionary of technical terms (p. 56) includes many words that are new to industry and science. . . . More attention to safety is needed at many small plants where (p. 48) accidents are relatively more frequent than in large establishments. . . . In lieu of the usual I-beam, a leading automobile manufacturer (p. 57) uses box sections. They lighten the chassis without reducing strength and rigidity. Specially-designed, automatic welding equipment makes it possible to turn them out on a production basis. . . . A new method of cleaning by spray-rinsing (p. 63) permits important savings in floor space and operating effort and is said to produce better plating. . . . Belt drive failures often may be avoided (p. 70) by providing for a factor of safety which varies under different conditions.

New Words For Industry

E C Kreutzberg

Do Purchasing Executives Lead Double Lives?

Most business men lead two lives. First, a home life with time for hobbies, sports, and family. Then the business day life with its many problems. Each is or should be complementary to the other. But when pressure of work forces a purchasing executive to bring business worries home, recreation time is cut and work at the office also suffers.

Research shows that personality characteristics are affected by overwork and nerve strain. There is a feeling of inadequacy for the job. Capacity for work decreases.

Under present conditions, with steel deliveries somewhat uncertain, the man whose job it is to purchase for production and profit is under increasing pressure. Now, as in the past, Ryerson stands ready to help lighten this work load—to save time for busy steel buyers. Large and diversified stocks make it easy to group orders, thus saving time in interviewing salesmen, placing and following orders, checking and receiving material, etc. Certified quality steels and immediate shipment are assured, and in an emergency Ryerson will go the limit to take care of you.

When you need steel, call Ryerson—then you can go home without a worry.

Joseph T. Ryerson & Son, Inc. Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON CERTIFIED STEELS

RYERSON

Canada Prepares for Three-Year War; May Spend $750,000,000 Next Year

War Supply Board Orders Since September 1 Aggregate $50,000,000 . . . Shipbuilding To Expand . . . Sheet and Bar Mills Working at Capacity . . . Aircraft Builders Busy

TORONTO, ONT.

■ CANADA'S national expenditures, including those for war, during the next fiscal year will top all records, it has been announced in Ottawa.

Ordinary government expenses for the current year total some $500,000,000, and involve only $72,000,000 for defense. For the coming fiscal year, starting April 1, 1940, it may be necessary to budget an aggregate outlay of $750,000,000.

Finance Minister Ralston declares the Canadian government is planning for a three-year war, and estimates the dominion's military efforts will cost about $315,000,000 the first year, or 50 per cent more than all the Canadian war costs up to March, 1916, in the World war.

Since the first of September the war supply board, headed by Wallace R. Campbell, has placed orders amounting to nearly $50,000,000. Included: Aircraft and components, $15,000,000; construction projects, $10,000,000; clothing and equipment, $8,000,000; foodstuffs, $4,000,000; fuel, $2,500,000; machinery, $1,500,000; motor vehicles, $450,000; and miscellaneous, more than $5,000,000. Railway equipment awards by the board aggregate an additional $25,000,000. Of the total war material contracts, some $10,000,000 went to American firms, largely for planes.

Will Build Sub-Chasers

Canada, the finance minister has stated, plans construction of anti-submarine and minesweeping craft in its own shipyards and is considering, in consultation with Britain, the construction of larger vessels.

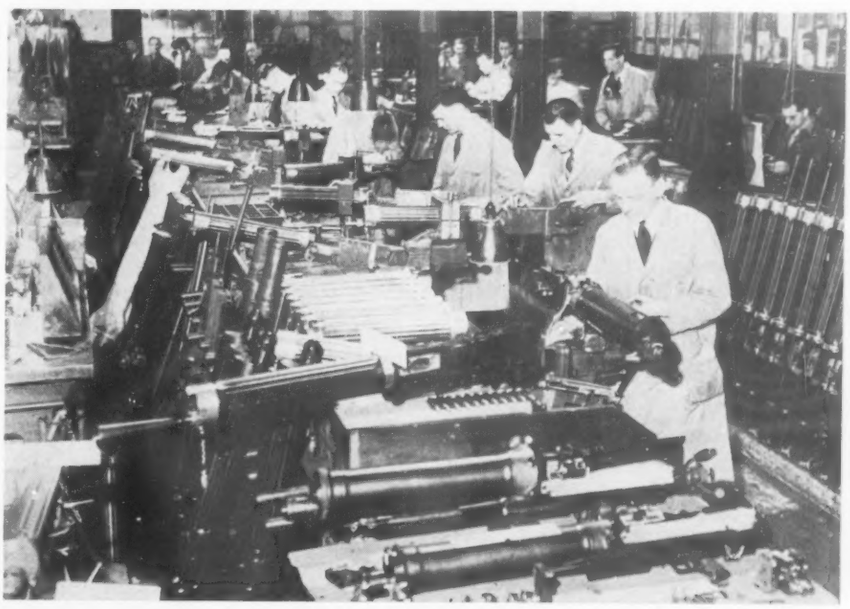
The dominion is to supply Britain with numerous items, chief of which are raw materials, foodstuffs, airplane fuselages and munitions. Britain needs many things, including large quantities of copper, nickel, lead and zinc. Another war need scheduled for heavy expenditure is the airplane, for both Canada and England. Engines will be supplied by Britain or the United States.

Large sums will be expended for munitions and guns, it is pointed out. While few contracts have been actually signed thus far, both the war supply board and the British purchasing mission in Ottawa are negotiating with contractors whose capacity they expect to largely absorb and in some cases extend.

Officials announce swift little motor boats equipped for aircraft salvage will be built in Canada to aid Royal Canadian Air Force in patrol of home waters. Bids have already been called for an initial order of eight such craft and contracts will be immediately placed through the War Supply Board. Boats will be unarmed and cost about $15,000 each.

Fairchild Aircraft Ltd., Toronto, is operating at capacity. The company is concentrating on a special order received from the dominion for Bristol Blenheim bombers. Award was booked some time before hostilities broke out. Business on its books and in prospect promise active operations for the next several years, entirely apart from large orders expected to appear soon for

Making Machine Guns in Royal Ordnance Factory



■ **Manufacturing Vickers machine guns in a royal ordnance factory "somewhere in England." Equipped with modern machines, installed during the months when the European war was only a threat, British armament plants are reported to be working day and night, preparedness now accounting for its feeling of security. NEA photo**

Canadian Associated Aircraft, in which Fairchild is partner.

Jurisdiction over the war supply board has been transferred by order-in-council from Finance Minister Ralston to Transport Minister Howe, according to official announcement. Operations of the board now are to be made known to the public. Up to the present there has been little information released regarding the buying program in munitions and supplies.

Arthur Purvis, Montreal, is newly-appointed head of the Anglo-French committee to co-ordinate the allies' purchases in America. Mr. Purvis also is chief of the British purchasing mission.

Canadian industrial leaders believe the anticipated large contracts for shells, guns, planes, ships and other war supplies will greatly stimulate iron and steel operations.

The really big orders have not been placed as yet. Plants have been put in proper shape and now are marking time until contracts appear. There is still considerable activity in plants which have not fully completed installation of new tools, and heavy purchases of machinery are being made, as reflected in sharply increased imports from the United States.

Canadian steelworks are formulating plans to supply the steel they believe will be needed for war business, and it is predicted the turn of the year will see a sharp increase in operations.

Sheet, Bar Demand Heavy

On the basis of inquiries now appearing, first quarter demand for various finished and semifinished steel materials will be heavy. Consumers are releasing their needs in connection with peacetime production, and these inquiries alone point to capacity booking for mills for the first three months of 1940. It is understood books will open in about two weeks for first quarter orders.

Mills are fully booked for this quarter on sheets and are making heavy deliveries. Warehouses report steady demand for sheets. It is said virtually all bar capacity has now been booked to the year's end and most producers are out of the market.

Wire and wire products continue in strong demand, with heavy call for fencing as result of construction of fences around guarded plants to prevent sabotage. The automotive industry has provided good business recently, and is expected to be in the market for larger tonnages for first quarter. Shipbuilding's scheduled sharp increase in activity will be reflected in large-scale demand for plates and other steel materials as well as power and miscellaneous equipment.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Dec. 2	Change	Same week 1938	Same week 1937
Pittsburgh ...	94	None	47	24
Chicago	94	— 1	56.5	30
Eastern Pa. ..	88	+ 2	37	31
Youngstown .	92	+ 2	65	35
Wheeling	93	None	62	30
Cleveland	90	+ 2	72	31
Buffalo	93	— 2	49	21
Birmingham ..	94	None	75	54
New England .	100	None	76	32
Cincinnati ...	80	—4.5	75	14
St. Louis	81	None	51.5	20.6
Detroit	93	+ 3	84	50
Average ...	94	+0.5	61	30.5

Firth Applauds Steel Price Reaffirmations

■ Approval of major steel roducers' action in extending present prices through first quarter was voiced last week by L. Gerald Firth, president, Firth-Sterling Steel Co., McKeesport, Pa.

Mr. Firth doubts that the United States will participate in European war business to the extent we did in the World war. He calls attention to the fact the basic labor rate in this country is approximately 62½ cents an hour, as against 28 to 30 cents in England.

"On top of this, the rate of exchange increases the differential a further 20 per cent. Increased freight and insurance add their quota to make the delivered price far higher than the English cost."

Mr. Firth cited as example the case of an American manufacturer who quoted an attractive price on stainless steel billets, only to be told that the delivered price was more than 50 per cent over the English price. At the same time a Swedish producer quoted a price far lower than the American figure.

"If then we are in for an era of prosperity, the greater part of it must come from home consumption. Under these circumstances, it is increasingly apparent to industry that nothing could be more foolish than to deliberately start a continuous spiral of rising prices and wages."

Firth-Sterling several weeks ago announced it would not increase tool steel prices for 1940, except as may be necessary because of general wage increases in the tool steel industry.

CUSTOMER PROTESTS

Leading steel producers last week received a letter from the president of a malleable castings company, protesting against producers' failure to advance steel prices. The writer, who requested his name not be used, declared: "What the foundry business needs now is a stiff advance in the price of pig iron which will force all the foundries to sell castings at higher prices sufficient to pay adequate wages, rebuild surpluses and make a return to investors."

PRODUCTION

STEELMAKING RATE RISES 0.5 POINT TO 94 PER CENT

■ STEELWORKS operations last week rose ½-point to 94 per cent. Four districts reported slight increases and three showed declines, the remaining five unchanged. Last year the rate was 61 per cent; two years ago 30.5 per cent.

Detroit—Advanced 3 points to 93 per cent, with possibility of further gain this week.

Youngstown, O. — Rose 2 points to 92 per cent, with three bessemers and 68 open hearths in production. Indication for this week is an unchanged schedule.

Chicago — Down 1 point to 94 per cent, the first backward move since Labor day. Except for the preceding week this is the highest rate since May 10, 1930.

St. Louis — Unchanged at 81 per cent for the third week. Schedule for this week indicates no change.

Birmingham, Ala. — Steady at 94 per cent, the rate prevailing since the end of October. Active open hearths number 22.

Central eastern seaboard—Gained 2 points to 88 per cent on additional active capacity by a leading producer.

Pittsburgh — Continued at 94 per cent, slight changes by various producers balancing. Shutdowns for repairs have been offset by adding idle equipment.

Wheeling — Held at 93 per cent for the ninth week, with no indication of change.

New England — All open hearths were operating, keeping the rate at 100 per cent for the third week.

Buffalo — One furnace taken off for repairs dropped the rate 2 points to 93 per cent.

Cincinnati — Slipped 4.5 points to 80 per cent, the result of shutdowns for repairs.

Cleveland — Recovered 2 points to 90 per cent, following completion of repairs to one open hearth.

■ Orders for fabricated steel plate booked in October, as reported to the bureau of the census, totaled 37,766 net tons, compared with 39,751 tons in September and 21,793 tons in October, 1938. Ten months' bookings this year were 307,746 tons; for the same period in 1938 they were 236,630 tons.

Pig Iron Output Sets Record for November; Operating Rate 90.5 %

■ A NEW record for production of coke pig iron in November was established last month, both in daily average and total tonnage. The daily average was 124,200 gross tons, 7188 tons, or 6.1 per cent, more than 117,012 tons in October and was the largest since May, 1929, with 125,753 tons. The November, 1938, average was 76,222 tons.

According to figures reported to STEEL, including estimates for the last two or three days of the month, total November production was 3,726,021 tons, 98,637 tons, or 2.7 per cent, greater than 3,627,384 tons made in October. This was the largest since August, 1929, with 3,746,198 tons and compares with 2,286,661 tons in November, 1938.

MONTHLY IRON PRODUCTION
Gross Tons

	1939	1938	1937
Jan.	2,175,423	1,444,862	3,219,741
Feb.	2,060,183	1,306,333	3,020,006
March	2,393,255	1,470,211	3,470,470
April	2,055,326	1,388,008	3,400,636
May	1,717,522	1,260,937	3,545,180
June	2,119,422	1,060,747	3,115,302
July	2,356,036	1,213,076	3,501,359
Aug.	2,660,513	1,495,514	3,616,954
Sept.	2,874,054	1,683,097	3,417,960
Oct.	3,627,384	2,067,499	2,891,026
Nov.	3,726,021	2,286,661	2,007,031
Ttl. 11 mo.	27,765,139	16,676,945	35,205,665
Dec.	.....	2,212,718	1,503,474
Total	.....	18,889,663	36,709,139

Output in the first 11 months this year totaled 27,765,139 tons, greater by 11,088,194 tons, or 66.1 per cent, than 16,676,945 tons made in the like period of 1938. In the first 11 months of 1937, 35,205,665 tons was made.

Relating production to capacity, operations in November averaged 90.5 per cent. This compares with 85.2 in October, 69.7 in September, and 62.4 in August. November, 1938, rate was 55 per cent.

During November one merchant stack and three steelworks units were placed in blast, and one in the latter class closed down, making a net gain of three. A total of 191 were operating at the end of the month, compared with 188, Oct. 31. The November total is the largest since August, 1937, also with 191. It compares with 169 at close of September and 138 for August.

Furnaces blown in during November were: In Indiana: Gary No. 10, Carnegie-Illinois Steel Corp. In Ohio: One Warren, Republic Steel Corp.; Mingo No. 1, Carnegie-Illinois Steel Corp. In Pennsylvania: Sheridan No. 2, E. J. Lavino & Co.

Stacks blown out or banked were: In Utah: One Provo, Columbia Steel Co.

AVERAGE DAILY PRODUCTION
Gross Tons

	1939	1938	1937	1936
Jan.	70,175	46,608	103,863	65,461
Feb.	73,578	46,655	107,857	63,411
March	77,201	47,426	111,951	66,004
April	68,511	46,267	113,354	80,316
May	55,404	40,675	114,360	85,795
June	70,647	35,358	103,843	86,551
July	76,001	39,131	112,947	83,735
Aug.	85,823	48,242	116,676	87,475
Sept.	95,802	56,103	113,932	90,942
Oct.	117,012	66,694	93,259	96,509
Nov.	124,200	76,222	66,901	98,331
Dec.	.....	71,378	48,499	100,813
Ave.	83,129	51,752	100,573	83,832

Dr. Krivobok To Address A. S. M. Western Chapters

■ Dr. V. N. Krivobok, associate director of research, Allegheny Ludlum Steel Corp., Brackenridge, Pa., will deliver the first of a series of lectures before western chapters of the American Society for Metals at Houston, Tex., Dec. 8. Topic of this address will be "Recent Developments in Heat and Corrosion Resisting Steels."

The lecture will be illustrated by specially prepared motion pictures and slides.

Other cities in which lectures will be presented and the titles are: San Francisco, Dec. 12, "Problems of Corrosion and Materials for the Purpose"; Los Angeles, Dec. 19, "Evaluation of Corrosion Resisting Alloys"; Portland, Oreg., Dec. 22, "Stainless and Heat Resisting Alloys"; and Seattle, Dec. 23, "Stainless and Heat Resisting Alloys."

OCTOBER IRON PRODUCTION

	No. in last day of Nov.	No. in last day of Oct.	Total tonnage Merchant	Total tonnage Nonmerchant
Alabama	18	18	104,215*	150,860
Illinois	14	14	81,375	236,545
New York	11	11	57,055	182,908
Ohio	44	42	90,952	756,981
Penna.	65	64	104,802*	1,088,343*
Colorado	3	3		
Indiana	16	15	3,000*	623,258
Maryland	6	6		
Virginia	1	1		
Kentucky	2	2		
Mass.	1	1		
Michigan	5	5		
Minnesota	2	2	20,231	225,496
Missouri	0	0		
Tenn.	0	0		
Utah	0	1		
West Va.	3	3		
Total	191	188	461,630*	3,264,391*

* Includes ferromanganese and spiegeleisen.

Study Nation's Minerals For "Emergency Value"

■ Studies looking toward releasing the United States from dependence on foreign countries for certain strategic minerals, development of processes to facilitate utilization of low-grade mineral deposits, and conservation of resources through prevention of waste, featured the bureau of mines' investigative program during the fiscal year 1939, said Dr. John W. Finch, director, in his annual report to Secretary Ickes last week.

Mineral industry studies now being conducted by the bureau in various western states, economic studies focused on mineral self-sufficiency, and research in treatment of low-grade ores of manganese, chrome and other metals have been excellent preparation for investigating the value in time of emergency of domestic deposits of strategic minerals, the report asserts.

RATE OF FURNACE OPERATION
(Relation of Production to Capacity)

	1939[1]	1938[2]	1937[3]	1936[4]
Jan.	51.0	33.6	76.6	48.2
Feb.	53.5	33.6	79.5	46.4
March	56.1	34.2	82.5	48.5
April	49.8	33.4	83.7	59.1
May	40.2	29.4	84.3	63.1
June	51.4	25.5	76.6	63.6
July	55.0	28.2	82.9	61.5
Aug.	62.4	34.8	85.7	64.3
Sept.	69.7	40.5	83.7	66.9
Oct.	85.2	48.0	68.4	71.0
Nov.	90.5	55.0	49.3	72.3
Dec.	....	51.4	35.6	74.2

[1]Based on capacity of 50,198,920 gross tons, Dec. 31, 1938; [2]capacity of 50,606,400 gross tons, Dec. 31, 1937; [3]first half on capacity of 49,512,737 tons, Dec. 31, 1936 —second half on capacity of 49,727,737 tons, June 30, 1937; [4]capacity of 49,777,893 tons, Dec. 31, 1935. Capacities by American Iron and Steel Institute.

Tin Production Rises

■ World tin production during third quarter totaled 47,200 gross tons, against 28,200 tons in the second and 34,500 tons in first quarter. World apparent tin consumption in third quarter is estimated at 38,800 tons, compared with 39,500 tons in second and 35,900 tons in first quarter. Total deliveries of principal tin smelters were 34,306 tons for third quarter, 32,586 tons in second and 40,506 tons in first quarter.

FINANCIAL

REPUBLIC DECLARES PREFERRED DIVIDENDS

■ REPUBLIC STEEL CORP., Cleveland, last week declared a $6 dividend on 6 per cent cumulative convertible prior preference stock, series A. Payment of a $7.50 dividend on 6 per cent cumulative convertible preferred also was authorized, both payable Dec. 21 to record of Dec. 11.

Dividend on the cumulative convertible prior preference stock represents payment in full to Jan. 1, 1940. Payment on the cumulative convertible preferred reduces accumulations on such stock to $18 per share as of Dec. 31, 1939.

WHEELING STEEL CLEARS ARREARAGE ACCUMULATIONS

All accumulations on Wheeling Steel Corp., Wheeling, W. Va., 5 per cent prior preferred stock will be cleared up Dec. 22, with payment of a $3.22 dividend. Regular quarterly of $1.25 a share on the same issue was also declared, payable Jan. 2 to record of Dec. 12. Board of directors also declared a quarterly dividend of $1.50 on the old 6 per cent preferred, payable Jan. 2. No action was taken on the $31.50 accumulation per share on this stock.

ARMCO PAYS ARREARAGES ON CUMULATIVE PREFERRED

Anticipating improved earnings for the final 1939 quarter, American Rolling Mill Co., Middletown, O., again declared, Nov. 27, a $1.25 dividend on arrears on 4½ per cent cumulative preferred stock. Payment is due Jan. 15 to record of Dec. 15.

"Operations in all Armco plants will continue virtually at capacity throughout the remainder of the year," said Charles R. Hook, president. "From present indications we expect a satisfactory rate of operations throughout the first quarter of 1940."

ALLEGHENY LUDLUM CORP. PAYS FIRST DIVIDEND

Allegheny Ludlum Steel Corp., Pittsburgh, has declared a 50 cents year-end dividend on common, payable Dec. 21 to record of Dec. 4. This is the first dividend payment by the corporation since the merger of Allegheny Steel Co. and Ludlum Steel Co. Ludlum Steel last paid 25 cents on common Feb. 15, 1938. Forty cents on common, paid by Allegheny Steel Dec. 16, 1937, was that company's last dividend.

♦

Woodward Iron Co., Woodward, Ala., announces it will redeem, Dec. 25, 1940, at par and interest, $750,000 principal amount of its second mortgage 5 per cent income bonds due Jan. 1, 1962. Holders may convert into common stock by Feb. 16.

DIVIDENDS DECLARED

General Electric Co., Schenectady, N. Y., quarterly of 65 cents, payable Dec. 20 to record of Nov. 24. Year's dividends total $1.40, compared with 90 cents per share for 1938.

Continental Steel Corp., Chicago, $1.25 on common, payable Dec. 22 to record of Dec. 15. Dividends of 25 cents were paid in previous quarters this year.

Inland Steel Co., Chicago, special of $1.50 on capital stock, payable Dec. 20 to record of Dec. 5. Total dividend payments for 1939 calendar year are $4 per share.

Rustless Iron & Steel Corp., Baltimore, 25 cents in cash on common, payable Dec. 12 to record of Nov. 24. This is first cash distribution on the issue. Dividend on common shares payable in preferred stock was disbursed in 1937. Regular quarterly of 62½ cents on preferred is payable Dec. 1 to record of Nov. 22.

Youngstown Steel Door Co., Cleveland, 50 cents, payable Dec. 15 to record of Dec. 1. Payments for year total $1; last year, 25 cents.

Midvale Co., Philadelphia, $3.50, payable Dec. 16 to record of Dec. 7. Payments for full year 1939 will total $6.50, compared to $5 for 1938.

Carpenter Steel Co., Reading, Pa., 60 cents interim, payable Dec. 20 to record of Dec. 9. This is second dividend declared since beginning of fiscal year, July 1. Fifteen cents was paid on Sept. 20.

National Steel Corp., Pittsburgh, 50 cents, payable Dec. 21 to record of Dec. 11. Forty cent dividend was paid Sept. 30.

Steel Consumers Show Increase in Earnings

■ NET PROFIT of 126 companies among equipment manufacturers, suppliers and leading iron and steel consumers during the first nine months totaled $164,029,398, an increase of 127.4 per cent over $72,132,446 reported by the identical companies for the same 1938 period. Only 13 of the group reported a third quarter net loss, compared to 46 that incurred a deficit for the corresponding period last year. Previous tabulations in STEEL, Oct. 23, p. 23; Oct. 30, p. 22; and Nov. 6, p. 31 listed 89 companies; the following includes 37. All figures are net earnings, except where asterisk denotes loss.

	Third Quarter 1939	Third Quarter 1938	Nine Months 1939	Nine Months 1938
Addressograph-Multigraph Corp., Cleveland	$204,322	$92,224	$707,354	$706,187
American Radiator & Standard Sanitary Corp., New York¶	1,374,757	153,444	1,428,185	752,835*
American Safety Razor Corp., Brooklyn, N. Y.	136,516	123,240	562,989	596,358
Borg-Warner Corp., Chicago	1,066,986	477,858*	3,483,036	1,111,462*
Briggs Mfg. Co., Detroit	30,475	694,078*	2,067,264	253,370
A. M. Byers Co., Pittsburgh	286,478	49,463*	582,848	242,134
Chicago Pneumatic Tool Co., Chicago§	288,652	199,162	676,891	574,354
Douglas Aircraft Co., Santa Monica, Calif.	985,368	728,815	2,382,159	1,821,964
Emsco Derrick & Equipment Co., Los Angeles	138,493	29,253	39,709	223,429
Fairchild Aviation Corp., Jamaica, L. I.	154,392	95,895	295,513	255,403
Federal-Mogul Corp., Detroit	80,490	64,915	366,496	177,145
Gar Wood Industries Inc., Detroit	10,263*	3,921	92,289	42,552*
General Steel Castings Corp., Eddystone, Pa.	179,283	628,350*	335,506*	1,247,020*
Greenfield Tap & Die Corp., Greenfield, Mass.	45,753	26,255*	103,456	29,923*
Hercules Motors Corp., Canton, O.	129,729	33,727	297,362	69,089
Kalamazoo Stove & Furnace Co., Chicago	109,381	98,657	20,541*	14,110*
Marlin-Rockwell Corp., Jamestown, N. Y.	465,684	156,171	947,390	388,696
Motor Wheel Corp., Lansing, Mich.	391,504	171,979	1,091,770	87,524
Muskegon Piston Ring Co., Muskegon, Mich.	80,458	68,386	298,434	113,485
National Cash Register Co., Baltimore	116,272	224,527	1,304,641	1,699,616
National Supply Co., Pittsburgh	347,923	331,245*	199,446*	1,176,981
Pitney-Bowes Postage Meter Co., Stamford, Conn.	141,398	118,661	378,968	371,186
Pressed Steel Car Co. Inc., Pittsburgh	206,115*	248,959*	621,584*	941,731*
Pullman Inc., Chicago	2,276,091†	599,432	3,380,218	1,244,333
Reed Roller Bit Co., Houston, Tex.	445,026‡	534,528	1,284,586	1,738,708
H. H. Robertson Co., Pittsburgh	142,977	82,151	360,595	183,465
Square D Co., Detroit	257,829	92,194	556,209	208,522
Superheater Co., New York	195,044	65,606	459,217	404,288
Thatcher Mfg. Co., Elmira, N. Y.	257,699	258,521	656,930	559,722
Timken Roller Bearing Co., Canton, O.	1,486,564	217,097	4,908,934	381,298
Trane Co., La Crosse, Wis.	144,143	63,115	262,526	74,249
Twin Coach Co., Kent, O.	89,668	44,077*	437,339	24,259
United-Carr Fastener Corp., Cambridge, Mass	63,932	59,346	288,228	1,273
Virginia Iron, Coal & Coke Co., Roanoke, Va.	38,058*	44,771*	128,485*	139,721*
Walworth Co., New York	104,304	224,601*	41,322*	1,092,036*
White Sewing Machine Corp., Cleveland	101,623	7,753	329,325	132,765
L. A. Young Spring & Wire Corp., Detroit	229,290*	410,691*	145,560*	815,493*

‡ Before deductions for federal taxes. ¶ Excluding profits of foreign subsidiaries. † Includes $655,993 non-recurring profit from sale of securities. § Excepting German subsidiaries.

LABOR

STEEL EMPLOYMENT UP 43,000 IN OCTOBER

■ MORE than 43,000 employes were added to the steel industry's payrolls during October, raising the total to 545,000, according to the American Iron and Steel institute. In September, the industry had 502,000, while 436,000 were employed in October last year.

Payrolls totaled $83,421,000 in October compared with $69,735,000 in September and $56,176,000 in October 1938.

Average number of hours worked per week by wage-earning employes rose during October to 38, against 35 in September and 31.2 in October, 1938. Their hourly earnings in October averaged 84.6 cents, 84.7 cents in September and 83.2 cents in October last year.

"WAGE STABILIZATION" SWOC DEMAND IN CHICAGO DISTRICT

Complete unionization of steelworks and fabricating plants in the Chicago-Calumet district still is goal of the CIO's Steelworkers' Organizing committee, last week declared Nicholas Fontecchio, district director.

Newly-conceived spearhead of the drive is a demand for "wage stabilization," defined as the maintenance of wages at a fixed level regardless of the industry's operating rate. While this would involve refusal to accept wage cuts when production is depressed, "no advance would be asked when activity is brisk."

Since SWOC has a contract with but one of the five steel producers operating in the district, no general wage increase is being sought. Advances will be requested, however, at fabricating plants which have signed contracts, in cases where rates are considered "out of joint."

Delegates to the recent district convention in South Chicago pledged to push the unionization drive "until every plant in the district is organized solidly into SWOC." Union officials, however, are vague as to their progress, claiming six new lodges have been formed to make a total of 57 for the district. They report closed-shop and checkoff clauses together with substantial wage increases have been written into a number of new and renewed agreements.

BAR MILL WAGES STEADY

Wage rates in plants represented in the Western Bar Iron association, having contracts with the Amalgamated Association of Iron, Steel and Tin Workers will continue through December, the same as in effect since July. The monthly bar price determination for November as reported last week reaffirms the following card rates. On boiling, bar and 12-inch mills, 2.15c; on guide and 10-inch mills, 2.25c.

LABOR DEPARTMENT ISSUES WAGE-HOUR ACT BULLETIN

Important provisions of the wage-hour law affecting employers have been published in pamphlet form by the wage and hour division, department of labor. Calculation of overtime pay and record-keeping requirements of the act are explained. Copies may be secured from the Information branch, wage and hour division, department of labor, Washington. Child labor regulations may be obtained from the department's children's bureau.

Procedure Guide for Government Contracts

■ *Matters of Procedure Under Government Contracts*, third edition, has been published by Fidelity & Deposit Co. of Maryland and its subsidiary, American Bonding Co. of Maryland, Baltimore, as a guide to those supplying goods or services to the government. The present edition has been revised to include changes in laws and their interpretation by courts. This is the first revision since 1935.

The author, O. R. McGuire, served until recently as counsel to the comptroller general of the United States. Those interested may obtain copies without cost by addressing either of the above companies.

Compressed Air Institute Named in FTC Complaint

■ Compressed Air institute, New York, and member companies have been charged by the federal trade commission with "entering into a combination having the effect of restricting and monopolizing trade and eliminating competition in the sale and distribution of compressed air machinery and pneumatic tools."

Member companies named are: Independent Pneumatic Tool Co., Chicago; Gardner-Denver Co., Quincy, Ill.; Ingersoll-Rand Co., New York; Worthington Pump & Machinery Corp., Harrison, N. J.; Cleveland Pneumatic Tool Co., Cleveland; Cleveland Rock Drill Co., Cleveland; Sullivan Machinery Co., Michigan City, Ind.; Chicago Pneumatic Tool Co., New York.

Complaint charges respondents "have exchanged, through the institute, price lists in order to establish prices at which their products were to be sold; have fixed uniform prices, arranged for the exchange of information, established a zone system to aid in the fixing of prices and discounts, adhered to the arrangement for the fixing of prices from time to time to conform to the uniform price and discount system, and used other methods and means designed to suppress and prevent price competition in their products."

Modern Traffic vs "Horse-and-Buggy" Bridges

■ **Need for replacing obsolete bridges with steel structures adequate for modern traffic demands was emphasized last week when this span, built near Yellow Springs, O., in 1899, collapsed as a truck scraped a girder. Hundreds of such bridges, designed to serve traffic demands 40 years ago, are to be found in the country, offer a potential market for thousands of tons of structural steel. NEA photo**

War Makes New Export Pattern

■ IRON and steel exports from the United States in October, excluding scrap, totaled 255,081 gross tons valued at $16,835,795, an increase of 4 per cent in volume and 8.75 per cent in value over 244,933 tons valued at $15,481,546 in September, according to bureau of foreign and domestic commerce. Compared with 201,473 tons valued at $11,463,580 tons exported in October, 1938, the margin is wide.

Exports for ten months, excluding scrap, aggregated 1,772,069 tons valued at $116,555,474, against 1,786,660 tons valued at $128,104,620 in the corresponding period in 1938, a loss of 0.8 per cent in volume and 0.9 per cent in value.

Shipments to Europe, principally the United Kingdom, rose from 51,879 tons in September to 74,632 tons in October. There was a corresponding decrease in trade with the Far East, 49,607 tons in October compared with 69,743 tons in September. Shipments to North and Central America and the West Indies increased only slightly, from 78,155 tons to 78,628 tons, but those to South America rose from 34,846 tons to 39,936 tons. Shipments to Africa increased from 10,310 tons to 12,278 tons.

Pig Iron Leading Export

Pig iron was the leading product in October exports, 50,134 tons, including 39,354 tons to the United Kingdom and 7190 tons to Sweden. Tin plate exports totaled 25,764 tons, including 3498 tons to Brazil, 3376 tons to Canada and 3085 tons to Egypt.

October scrap exports, 336,775 tons valued at $16,835,795, were slightly greater than 330,680 tons valued at $15,481,546 exported in September. In October, 1938, scrap exports were 223,954 tons valued at $3,238,232. Scrap exports for ten months were 3,098,367 tons valued at $46,572,685 compared with 2,401,793 tons valued at $37,034,379 in the corresponding months last year.

Japan was the principal scrap buyer, with 248,176 tons, followed by the United Kingdom, 38,563 tons and Canada, 26,362 tons.

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

(Gross Tons)

Articles	Oct. 1939	Sept. 1939	Jan. thru Oct. '39
Pig iron	50,134	28,192	121,494
Ferromanganese and spiegeleisen	251	329	792
Other ferroalloys	861	462	2,639
Ingots, blooms, etc.:			
Not containing alloy	13,633	13,283	90,712
Alloy, incl. stainless	5,004	8,035	19,766
Steel bars, cold fin.	1,398	807	7,545
Bars, iron	56	74	544
Bars, concrete	3,616	3,205	26,816
Other steel bars:			
Not containing alloy	10,381	16,460	99,686
Stainless steel	6	8	241
Alloy, not stainless	643	434	9,785
Wire rods	2,779	1,829	20,394
Boiler plate	672	1,673	6,703
Other plate, not fab.:			
Not containing alloy	15,567	20,268	196,523
Stainless steel	14	9	107
Alloy, not stainless	83	686	1,949
Skelp, iron or steel	14,085	13,172	44,517
Sheets, galv. iron	439	427	4,803
Sheets, galv. steel	11,310	8,491	82,410
Sheets, "black" steel:			
Not containing alloy	19,562	20,171	218,103
Stainless steel	103	72	768
Alloy, not stainless	502	242	3,095
Sheets, black iron	1,293	775	6,678
Strip steel, hot-rolled:			
Not containing alloy	4,629	1,434	18,922
Stainless steel	66	42	560
Alloy not stainless	19	39	370
Strip steel, hot-rolled:			
Not containing alloy	5,452	5,332	46,002
Stainless steel	71	.....	299
Alloy, not stainless	16	5	66
Tin plate, taggers' tin	25,764	27,111	201,263
Terne plate	1,133	590	4,591
Tanks except lined	2,330	1,121	21,118
Shapes, not fabricated	10,201	19,409	90,128
Shapes, fabricated	2,523	2,461	26,007
Plates, fabricated	380	490	3,637
Metal lath	183	134	1,016
Frames and sashes	164	107	937
Sheet piling	752	1,531	6,996
Rails, 60 lbs.	1,887	615	30,838
Rails, under 60 lbs.	125	492	3,380
Rails, relaying	1,541	1,887	14,159
Rail fastenings	381	1,928	7,802
Switches, frogs, crsgs.	34	103	1,675
Railroad spikes	204	300	2,466
R. R. bolts, nuts, etc.	229	158	1,362
Boiler tubes, seamless	2,162	593	7,565
Boiler tubes, welded	31	173	496
Pipe:			
Smless casing, oil-line	6,759	6,766	53,210
Do., welded	2,058	634	5,198
Seamless black	917	673	6,548
Pipe fittings:			
Mall. iron screwed	665	394	3,523
Cast iron screwed	189	171	1,947
Pipe and fittings for:			
Cast-iron pressure	1,961	4,082	22,431
Cast-iron soil	1,530	1,053	8,308
Pipe, welded:			
Black steel	1,185	1,196	13,443
Black wrought iron	214	307	2,993
Galvanized steel	2,786	3,111	19,080
Galv. wrought iron	363	258	2,589
*All other pipe, fitgs.	746	418	4,473
Wire:			
Plain iron or steel	2,362	2,640	22,648
Galvanized	2,909	2,067	21,358
Barbed	6,800	4,964	39,657
Woven-wire fencing	367	509	2,776
Woven-wire sc'n cloth:			
Insect	47	32	366
Other	205	89	1,145
Wire rope and cable	741	399	3,524
Wire strand	168	119	905
Electric welding rods	181	96	1,256
Card clothing	1	.....	29
Other wire	1,140	842	6,960
Wire nails	2,720	1,482	17,068
Horseshoe nails	73	83	727
Tacks	37	20	239
Other nails, staples	586	352	3,756
Bolts, mach. screws	814	757	6,766
Castings:			
Gray iron (inc. semisteel)	316	185	2,813
Malleable iron	194	49	868
Steel, not alloy	91	113	935
Alloy, incl. stainless	149	42	1,263
Car wheels, tires, axles:			
†Wheels and tires	914	945	8,786
†Axles, no wheels	70	231	7,347
†Axles with wheels	2	3,281	7,046
Horseshoes and calks	4	3	156
Forgings, n.e.s.:			
Not containing alloy	2,027	634	10,654
Alloy, incl. stainless	121	57	1,553
Total	255,081	244,933	1,772,069
Scrap, iron and steel	334,664	327,724	3,075,998
Scrap, tin plate	760	1,637	8,935
Tin plate circles, strips, cobbles, etc.	340	587	5,565
Waste-waste tin plate	1,011	732	7,871
Total scrap	336,775	330,680	3,098,369
GRAND TOTAL	591,856	575,613	4,870,483
Iron ore	221,676	149,077	877,438

*New class. Includes flanged malleable cast-iron fittings, expansion joints, and riveted pipe and fittings.
†New class.

Machinery Exports Gain; War Has Little Effect

■ Industrial machinery exports in October were valued at $23,941,763, an advance of 15 per cent over $20,875,202 in the same month last year, according to the machinery division, department of commerce. The division states that the war situation in Europe has had little effect on actual machinery shipments abroad, October exports approximating the monthly average for 1938 and the first nine months of 1939.

Power-driven metalworking machinery showed a 21 per cent gain, $9,121,340 compared with $7,513,557 a year ago. Largest increases were in lathes, boring mills, screw machines, millers, gear cutters and grinders. Rolling mill equipment and foundry machinery declined. Metalworking equipment other than power-driven increased 42 per cent.

Mining, well and pumping machinery dropped slightly, from $4,582,379 last October to $4,448,900, largely due to smaller shipments of petroleum well and refinery equipment. Construction and conveying machinery made a small advance and power-generating equipment stood at about the same level.

American Machines Speeding French Output

■ Addressing an American club luncheon in Paris last week, French Air Minister Guy LaChambre said France spent two billion francs in the United States in a final peacetime effort to increase the output of its aircraft industry.

While unable to reveal production since war began, he asserted France now has 1000 machine tool shops delivering parts to assembly plants, with the result output is nearly double that of the prewar period. Many factories are equipped with American machinery. One produced more in the first ten months this year than in four preceding years.

October Farm Equipment Exports Up 10 Per Cent

■ October exports of farm implement and machinery gained 10 per cent over the same month last year, rising from $5,016,518 to $5,532,667. Most of the increase was in tractors, tractor parts and accessories, as reported by the machinery division, department of commerce.

Exports in the tractor classification were valued at $4,356,092, compared with $3,576,413 in October last year, a 22 per cent increase.

Tillage implement shipments were slightly lower.

What's New at Pittsburgh . . .

By R. L. HARTFORD
Pittsburgh Editor, STEEL

■ NEW type agreement was signed last week between Pittsburgh Tube Co. and Steel Workers' Organizing committee. Covering 400 workers at the company's Monaca plant here, contract authorizes company to discharge any employe found guilty of fomenting, aiding or abetting any strike whatever, obstructing or interfering in any way with the orderly operation of company's business.

"Strike-proof" clause was added to standard steel industry agreement, first signed in 1937 and renewed in 1938. In return for this concession by the union, company has granted the closed shop and checkoff. In the latter concession, membership in the union becomes a condition of employment by the company, and the monthly $1 dues are deducted from the pay of any worker who piles up 40 or more hours during the month.

Effective for a year beginning Dec. 1, 1939, agreement is one of the first to contain either clause in the steel industry. It is the first union shop contract this company has made with any union, and according to union officials here, the performance of this contract will be an important factor in further negotiations in the industry by SWOC.

♦

Stainless steel output at its Buffalo plant will be increased by Allegheny Ludlum Steel Corp. New electric furnace soon will be installed. Buildings will be enlarged and additional equipment installed later. Chief output of this unit now is stainless steel castings, steel for which is produced by an improved type electric furnace developed by Buffalo Electric Furnace Corp., under whose license the Allegheny Ludlum mill operates.

♦

Blast Furnace Innovation

A new wrinkle in blast furnace practice was instigated by L. E. Riddle, superintendent, and S. W. Schott, assistant, Duquesne and Isabella furnaces, Carnegie-Illinois Steel Corp. here. Because of the peculiarities of the business situation during late 1937 and 1938, four of the Duquesne furnaces were put on bank and were not blown in again until more than a year after the banking. Instead of shoveling out the old material, before the furnaces started again, the crews blew the ashes and dust out of the cinder notch and tapping hole, opened up four tuyeres and started the coke with oxygen lances. Slag was taken after six hours, and iron after 13 hours. Open-hearth quality iron was produced in 52 hours.

Also, three furnaces which had been shoveled out, one of which had been relined, were blown in with regular blow-in burden but without using a booster fuel such as wood or charcoal. Tuyeres were lit with oxygen lances and after about 25 minutes the blast was turned on. Open-hearth iron was made in one of these after 6 hours, the others ranging up to 28 hours. Silica averaged 2.42 and sulphur 0.020, on the first casts.

♦

Work has begun at the Neville Island yards of Dravo Corp. on a fleet of 14 all-welded steel hopper barges for Wheeling Steel Corp. These units will be 210 feet long, 26 feet wide and 11 feet deep. Carrying capacity of each will be 1200 tons. Delivery is now being completed on a six-unit fleet of similar barges for the coal trade of Shearer & Sons, Winchester, Ky.

♦

Activity Index at Peak

Several indicators used in compiling the index of business activity here are reaching new highs almost weekly, according to the bureau of business research, University of Pittsburgh. Index itself now stands at an all-time high of 132.9, based on a 1923-25 average as 100. Current figure represents a gain of one point over the preceding week, which was the first time in the 55-year history of the index that a figure over 130 points has been reached. Items included in making up the index are iron and steel production, electric power output, coal production, carloadings, river shipments, department store sales, motor car registrations, street railway and bus traffic, and bank debits, all in the Pittsburgh district.

All these units are high, but the final push has been given by iron and steel production and electric power output, both of which are at an all-time high. The bureau also publishes an index showing the activity, adjusted for growth. This figure now stands at 117.5, slightly under the highs for 1906, 1918, 1923 and 1929.

♦

State of Pennsylvania has had trouble with the paint on its automobile license plates this year, and is reported to be contemplating a more permanent type of plate made of a corrosion resistant steel or nonferrous material. A commission, appointed jointly with New York state, has been investigating and is expected to report soon.

Unique, but Impractical

■ **Stainless steel buckets for an 80,000-kilowatt General Electric turbine form a flared skirt for this model. The buckets are worth $5000—rather expensive, and a trifle too heavy for a skirt**

MEN OF INDUSTRY

■ H. B. CARPENTER, manager of the Cleveland district, Republic Steel Corp., has been appointed assistant vice president in charge of operations. Earl M. Richards, also assistant vice president in charge

H. B. Carpenter

of operations, with Mr. Carpenter, will assist C. M. White, vice president in charge of operations.

J. L. Hyland, manager of Republic's Chicago district, will succeed Mr. Carpenter as manager of the Cleveland district. He will have charge of Republic's Cleveland continuous strip mill and plants acquired by Republic from Corrigan-McKinney.

Mr. Carpenter, a graduate of the University of Michigan in 1906, gained a valuable background of experience in the steel industry in the metallurgical, open-hearth, blast furnace and coke oven departments of Carnegie Steel Co., Jones & Laughlin Steel Corp., Pittsburgh Crucible Steel Co., and Cambria Steel Co., Johnstown, Pa. In 1916 he joined Colorado Fuel & Iron Corp., Pueblo, Colo., where he became assistant to the vice president and later manager of the plant. In 1928 he joined Republic Iron & Steel Co. as manager at Youngstown, remaining in that capacity with the formation of Republic in 1930. Five years later he was made manager at Cleveland.

Mr. Hyland began his career in the steel industry as a chemist in 1906. In 1915 he became chief chemist, Illinois Steel Corp. at Gary, and from 1920 to 1930 was superintendent of steel production. He became Chicago district manager for Republic in 1930.

♦

Myron C. Taylor, former chairman, United States Steel Corp., is recuperating from an infection, at the Harkness Pavilion Medical center, New York.

♦

C. H. Vaughan, 1112 South Twenty-sixth street, Birmingham, Ala., has been appointed representative in the southeastern states by Allegheny Ludlum Steel Corp., Pittsburgh.

♦

Herman Falk, president, Falk Corp., Milwaukee, was honored at a banquet given Nov. 28 by 60 employes who have been with the company 30 years or more. Members of the Falk family and supervisory forces of the plant also attended.

♦

J. Thayer Melvin, treasurer, Oliver Iron Mining Co., Duluth, United States Steel Corp. subsidiary, has resigned and will move to Texas. He started with the Oliver company

J. L. Hyland

in Pittsburgh in 1900; was transferred to Duluth as an assistant cashier and was made treasurer in 1931.

♦

George F. Bertrand has become associated with Sheffler-Gross Co., Philadelphia, as sales engineer. Mr. Bertrand has had over 15 years experience in the air conditioning field.

♦

Charles Kyle Archer retired Nov. 30 upon completing 33 years of service with Carnegie-Illinois Steel Corp., Pittsburgh. He had been chief of the company's photographic department since 1914.

♦

Ralph M. Hoffman, the past eight years vice president and sales manager of Link-Belt Co. Pacific division, San Francisco, has been named assistant to the president of the parent organization, with headquarters in Chicago. Mr. Hoffman joined Link-Belt in 1923 as manager of Link-Belt Meese & Gottfried Co.'s Seattle branch. He served in that capacity until 1931 when he was made vice president and sales manager of the Pacific division.

♦

William R. White, general night foreman, Waukegan, Ill., works, American Steel & Wire Co., was guest of honor at a dinner Nov. 25, at which time he was presented with the United States Steel Corp. 50-year gold service medal. He retired Nov. 30.

♦

Maynard D. Church has been elected vice president, Worthington Pump & Machinery Corp., Harrison, N. J. He will continue as president, Moore Steam Turbine Corp., a subsidiary of Worthington Pump.

♦

Frank P. Norris, vice president and manager, Phoenix Iron Co., Phoenixville, Pa., has announced his retirement effective Jan. 1, after 50 years continuous service. Mr. Norris will continue for a time in a consulting capacity.

Malcolm Farmer will fill the vacancy created by Mr. Norris' retirement and will serve as executive vice president. He formerly was superintendent of the Phoenix company's rolling mills, later executive vice president, Stanley Works, New Britain, Conn., and in recent years was director of athletics at Yale university.

♦

J. C. Keyworth, formerly with Triplex Screw Co., Cleveland, has joined the sales staff of Lamson & Sessions Co., Cleveland, to cover the

J. C. Keyworth

Midwest territory. He has had considerable experience in the bolt and nut industry, having been with Ferry Cap & Set Screw Co., Cleveland Brass Mfg. Co., and Wasmer Bolt & Nut Co., all of Cleveland.

♦

Morris Machlin, Machlin Bros. Inc., New York, has been elected

president, New York chapter, Institute of Scrap Iron and Steel Inc. George Betten, S. Betten Inc., New York, has been elected vice president, and Marvin Lipman, Aero Scrap Iron & Metal Co. Inc., New York, secretary.

♦

Jerome Strauss and J. R. Davis, Vanadium Corp. of America, recently moved to the general executive offices at 420 Lexington avenue, New York. Mr. Strauss, vice president in charge of research and development, was formerly at the Bridgeville, Pa., laboratories, while Mr. Davis, vice president in charge of operations, was located at the Niagara Falls, N. Y., plant.

♦

A. B. Hoefer has been appointed eastern district manager, Udylite Corp., Detroit, with headquarters at 30 East Forty-second street, New York. He replaces W. L. Cassell, who has resigned to join MacDermid Inc., Waterbury, Conn. Following graduation from Purdue uni-

L. J. George

versity, Mr. Hoefer joined General Chromium Corp., Detroit, and early in 1929 joined the New York office of Udylite as sales engineer. L. J. George, sales engineer, associated with Udylite since 1929, has been transferred from the Cleveland office to New York.

♦

Ralph Hubbart, heretofore vice president, Allied Products Corp., Detroit, has been elected president, succeeding the late C. C. Richards. W. E. Ray, secretary-treasurer, has become vice president and secretary, and J. F. Halm, formerly assistant secretary and assistant treasurer, now is treasurer and assistant secretary.

♦

Twelve outstanding graduates of Columbia University School of Engineering were selected to receive the first awards of medals for distinguished engineering achievement,

A. B. Hoefer

established in memory of Prof. Thomas Egleston, pioneer in engineering education. Awards were presented Nov. 27 to the following:

Walter H. Aldridge, president, Texas Gulf Sulphur Co., New York; Gano Dunn, president, Cooper Union; Arthur S. Dwight, president, Dwight & Lloyd Metallurgical and Dwight & Lloyd Sintering companies, New York; Irving Langmuir, associate director, General Electric research laboratory, Schenectady, N. Y.; Leon S. Moisseiff, New York consulting engineer; Edwin H. Armstrong, professor of electrical engineering, Columbia university; Henry Krumb, New York consulting engineer; Marston T. Bogert, professor of organic chemistry at Columbia; Stephen J. Pigott, managing director, John Brown Co., Clydebank, Scotland; Robert Peele, professor emeritus of mining at Columbia; Robert C. Stanley, president, International Nickel Co., New York, and Arthur L. Walker, New York consulting metallurgist.

DIED:

■ PROF. GEORGE ERLE BEGGS, 56, head of the department of civil engineering, Princeton university, and a consultant on some of the nation's largest bridge construction projects, Nov. 23 at his home in Princeton, N. J. Professor Beggs was a member, American Society of Civil Engineers, American Institute of Consulting Engineers, International Association for Bridge and Structural Engineering, American Society for Testing Materials, and last Oct. 24 was elected chairman,, Engineering Foundation, New York.

♦

William Y. Banks, 54, manager, steel castings sales division, Brackenridge, Pa., plant of Allegheny Ludlum Steel Corp., Nov. 23 at his home in Aspinwall, Pa. He joined Allegheny Steel Co., predecessor of Allegheny Ludlum, in 1924 as a salesman.

♦

Charles Pasche, president, Davenport-Besler Corp., Davenport, Iowa, in that city, Nov. 15.

♦

Phillip J. Brennan, 52, for 20 years purchasing agent, Austin Co., Cleveland, and an employe of the company 24 years, in Cleveland, Nov. 25.

♦

Bracken A. Todd, 46, superintendent, rolling and blooming mills, Andrews Steel Co., Newport, Ky., Nov. 21. At one time he was associated with Pittsburgh Steel Co.

♦

John H. Pearce, 65, Hibbing, Minn., an engineer for the Great Northern Iron Ore Properties, and a member, Engineers' Club of Northern Minnesota, recently.

♦

Chris Zimmerman, 70, vice president, W. S. Tyler Co., Cleveland, before his retirement three years ago, in Cleveland, Nov. 29. He had been associated with the company 50 years.

♦

Edmund B. McKenna, 64, president, Standard-North Buffalo Foundries Inc., Nov. 24 in Buffalo. Mr. McKenna founded Standard Foundry Co. in 1904, predecessor to Standard-North Buffalo Foundries.

♦

John Andrews Jr., 61, assistant to the vice president, Westinghouse Electric & Mfg. Co., Pittsburgh, and former district manager of the company's Cleveland office, in Pittsburgh, Nov. 24.

♦

James A. Morton, 53, steam and fuel engineer, American Steel & Wire Co., Cleveland, in Cleveland, Nov. 24. He was a member, American Society of Mechanical Engineers, Association of Iron and Steel Engineers, and Cleveland Engineering society.

♦

Raymond A. Spencer, 55, assistant general manager, Canadian Bridge Co. Ltd., Walkerville, Ont., Nov. 26 at Metropolitan hospital, Windsor. Associated with the Bridge company 27 years, Mr. Spencer also was assistant general manager, Canadian Steel Corp., Essex Terminal railway, Canadian Steel Lands Co., and Canadian Steel & Wire Co.

♦

John L. Osgood, 85, prominent as a dealer in machinery tools and shop equipment, in Buffalo, recently. He founded the J. L. Osgood Tool Co. in 1902 to manufacture and merchandise hand tools and equipment for general industrial use. He was a member, American Society of Mechanical Engineers.

Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ PRESIDENTIAL suggestions as to possibility of expanding the West Coast steel industry have caused a greater stir than anyone here anticipated. Communications from all parts of the nation are being received by various departments, while federal experts have been studying phases of "the project."

Senators McNary and Schwellenbach both have conferred with Mr. Roosevelt in this matter, and the geological survey and bureau of mines are making investigations preliminary to reporting to Secretary of the Interior Ickes. They are putting into written form the information available in their files. Possibly their report will find its way to the White House.

While there has been much talk here of late about enlarging the steel industry in the west, government experts differ as to its feasibility.

Power-Selling Program?

Some more out-spoken than others believe the administration is interested in establishing a large-scale western steel industry as a prospective user of the tremendous electric power to be available upon completion of Grand Coulee and Bonneville projects. They feel the government is going to have a hard time marketing all the power to be generated.

A major obstacle to a western steel scheme is the shortage on the Pacific coast of iron ore and coking coal. In regard to the latter, however, a process just developed makes it possible to substitute "wood coke" for coke made from coal. This is produced from wood waste, said to total some 40,000,000 tons a year in the Northwest.

The President has several times expressed his interest in a West Coast steel industry not only from the standpoint of available power, but because of the shipbuilding industry which he believes would be facilitated.

In this picture, also, is "decentralization of the steel industry," long advocated by the war department for defense reasons.

TAX PROGRAM PRESENTED BY CHAMBER OF COMMERCE

Finance committee of the United States Chamber of Commerce has presented a tax revision program to treasury department officials in response to the department's request for recommendations. Urged by the chamber:

Reduction of corporate income tax rate by progressive stages to 15 per cent.

Restoration of right to file consolidated returns by corporations affiliated through 95 per cent stock ownership.

Reduction of individual surtaxes to point of greatest revenue and encouragement to investment, with maximum surtax not to exceed 40 per cent.

Simplification of the capital gains and loss provisions, shortening the holding period, with the rate on capital gains reduced to 12½ per cent.

Elimination of double taxation of dividends by exempting from the normal tax dividends received by individuals and by exempting intercorporate dividends from the corporate income tax.

Extension of the present two-year carryover of net operating losses. The existing two-year provision may earlier have sufficed, but in view of fluctuating business conditions in recent years now is inadequate.

Repeal of the capital stock and excess profits taxes as soon as revenue conditions permit; meantime, annual declaration of stock values should be permitted.

Provision for more liberal treatment of earned income.

Depreciation provisions should be so drafted, interpreted and applied as to allow the taxpayer full credit for depreciation.

Reduction of the present excessively high estate taxes and simplification of the present rate structure.

Increase in the exemption allowed for estate tax purposes.

Arrangement whereby the states may receive a larger proportion of death dues.

To avoid the devastating effect on estates which include certain types of assets, provision should be made whereby the decedent, during his lifetime, could specifically set aside an adequate portion of estate earmarked for estate tax purposes, such portion to be free from the estate tax.

Development of a plan whereby the intent of congress to make gifts for charitable purposes free from estate taxes would be more effectively carried out.

Elimination of difficulties and annoyances in connection with administration of the excise taxes and adjustment of these taxes so as to minimize their restrictive effect on business.

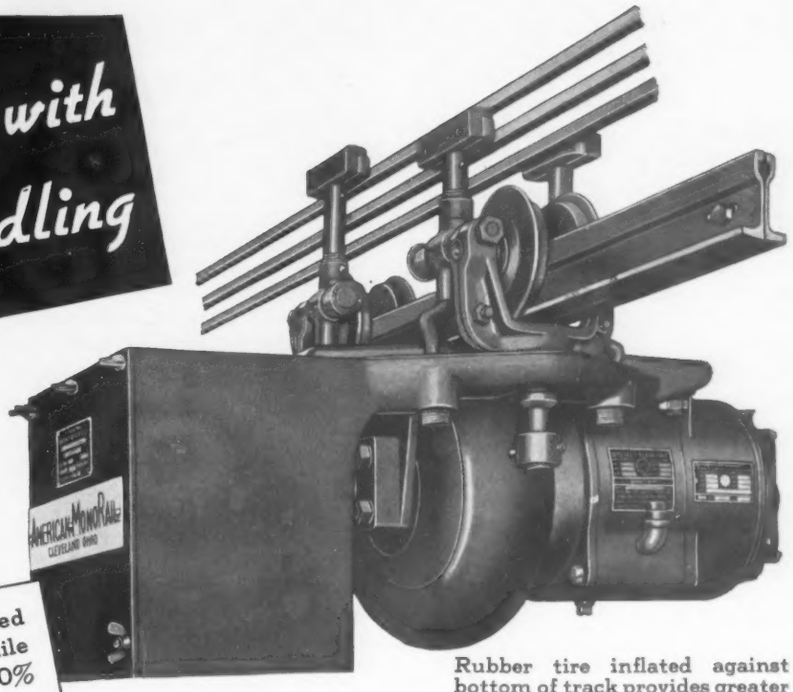
PERSONNEL SHUFFLED IN COMMERCE BUREAU REVISION

Scheduled reorganization of the commerce department's bureau of foreign and domestic commerce has been effected in part, with more yet to come.

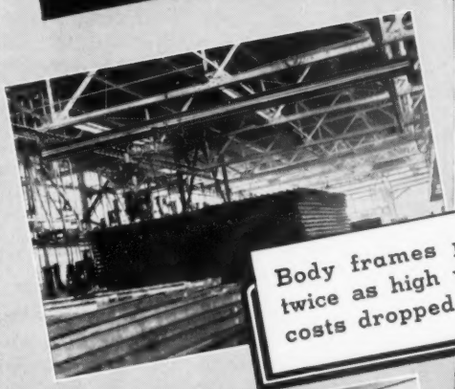
Secretary of Commerce Hopkins last week accepted the resignation of Fletcher Rawls and Dr. Nathaniel A. Engle, both assistant directors of the bureau. Mr. Rawls will return to his former post as chief of the foodstuff division, while Dr. Engle will devote his time to promoting business research at state universities in conjunction with the bureau. Carroll Wilson, mainspring of the reorganization plan, is to take over the duties of Mr. Rawls, while Ernest A. Tupper, bureau's chief statistician, will assume some of Dr. Engle's activities.

Further reorganization will deal with the bureau's commodities divi-

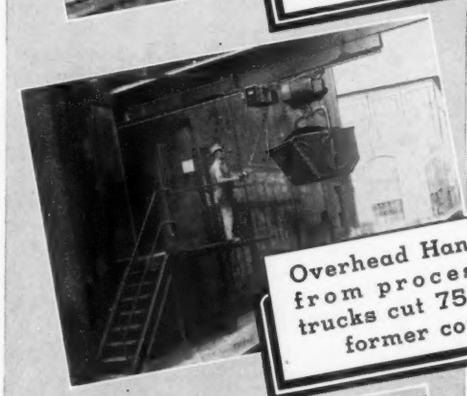
Reduce Costs with Overhead Handling



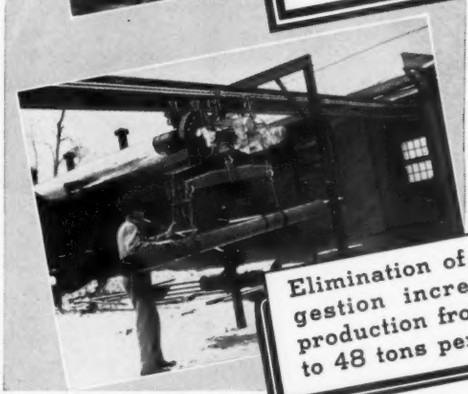
Rubber tire inflated against bottom of track provides greater tractive contact.



Body frames piled twice as high while costs dropped 50%



Overhead Handling from process to trucks cut 75% off former cost.



Elimination of congestion increased production from 26 to 48 tons per day.

Tremendous draw-bar pull from the American MonoTractor propells carriers and cranes for low handling costs.

Time studies obtained after installation of overhead handling equipment often reveal definite reductions in costs together with more productive use of man-hours.

Mechanical methods provide not only low cost movement of goods but also releases skilled labor for profitable production.

This is accomplished in American MonoRail systems by the elimination of floor congestion, by increasing unit loads, by faster and more accurate movement and finally, with the American MonoTractor, by complete automatic transportation.

Compact electrification together with the many exclusive control features of the American MonoTractor, permit the application of automatic equipment to handling problems in nearly every industry. Costs are reduced in direct proportion to the number of man-hours saved.

Engineering consultation with men of long experience in this highly specialized field often brings up hidden possibilities for cost saving or production increases. This service is available at no obligation.

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sions, including metals and minerals. It is believed none of the present activities of the commodities divisions will be curtailed.

REPORT 500 TONS OF TIN EXPORTED FROM U. S.

Officials of the army and navy munitions board last week had much to say about a report, as yet unverified, that 500 tons of tin were exported during November from this country to a Scandinavian nation.

Pointing out both President Roosevelt and the board have requested no strategic minerals be exported, one official declared such exports undermine the government's efforts to build up reserve stocks for an emergency. "At the present time," he said, "there appears considerable possibility of a shortage of tin and other essentials in the United States, and the re-export of such materials is viewed with concern."

PROPOSED FREIGHT CUT ON TIN PLATE SUSPENDED BY ICC

Railroad tariffs proposing reduced rates on tin plate in carload lots from points in Alabama, Illinois, Indiana, and Missouri, to Beaumont, Dallas, Houston and Pt. Arthur, Tex., have been suspended by interstate commerce commission until June 25, 1940.

It was proposed to reduce rates on tin plate from 55 cents per 100 pounds from the Chicago district to 43 cents per 100 pounds (100,000 pounds minimum); and to 35 cents from 45 cents per 100 pounds (60,000 pounds minimum), from the Birmingham and St. Louis districts.

SAYS TIN SHORTAGE NOT LIKELY IN UNITED STATES

"Unless hostilities spread to southeast Asia, there is little reason to expect the relatively limited tonnage required for transporting American tin supplies cannot be assured," says Alvin Barber in a report on "Tin Control in a Major War" in *Far Eastern Survey*, a nongovernmental publication.

"European nations may experience difficulties, but American supply routes are largely outside the present war zones. Although in 1937 some 35 per cent of world tin ore was smelted in Europe, chiefly in the United Kingdom and the Netherlands, and a somewhat higher percentage in 1938, European smelter production is of minor importance to the United States."

Of 88,000 tons of tin imported by this country in 1937, less than 10,000 tons came from Europe; in 1938, only 5900 tons out of 50,700 tons.

Mr. Barber points out the experience of Italy and Japan seems to indicate an increased use of tin results from modern warfare. "During the Ethiopian campaign Italian consumption of tin rose abruptly more than 50 per cent.

"Even assuming, however, that tin absorption doubles in the United Kingdom and France as a result of the war, this amounts to only 35,000 additional tons on the basis of the large consumption in 1937. To meet this additional requirement there are 12,000-13,000 tons available which formerly went to the German market, now cut off, and 3000 to 4000 tons from Czech and Polish areas now under German control."

REPORTS GERMANY WILL FILL CHILEAN RAILROAD ORDER

Germany intends to fill a 10,000,000 Reichsmark order for railway equipment placed by Chile before outbreak of the war, it is reported by Merwin L. Bohan, commercial attache at Santiago, Chile.

According to Bohan, a decree of the Chilean ministry authorizes the state railways to increase the contract signed in 1937 with Ferrostaal A. G., of Essen, Germany, to 10,825,888 Reichsmarks. The 825,888 Rm. increase is to cover German price advances, augment the order for replacement parts, acquire telemeter equipment and purchase equipment and instruments necessary for maintenance of the trains.

Arrangements apparently have been made for the first deliveries in January, the second in March, third in June, 1940. The original order was for 11 articulated electric-powered trains, 5 articulated diesel-electrics, 3 electric locomotives, 3 fixed substations, one portable substation and supplementary equipment and replacement stock.

MANGANESE ORE SHIPMENTS UP DURING SEPTEMBER

Domestic production of manganese ore, comprising 35 per cent or more natural manganese, during September amounted to 3000 long tons, while shipments were 2500 tons, and stocks at close of the month 1300, reports the bureau of mines. Rate of shipments during September was somewhat above the monthly average of 2110 tons for 1938.

Arkansas, Montana and Tennessee supplied 89 per cent of the total ore shipped, although production also was reported in Georgia, New Mexico, Virginia and West Virginia.

September imports for consumption of manganese ore containing 35 per cent or more manganese, were 87,581 long tons. Of this Gold Coast supplied 30 per cent, British India 27 per cent, Soviet Russia 23 per cent, Brazil 14 per cent, and Cuba 6 per cent. For the first nine months of 1939 imports for consumption totaled 358,984 long tons.

Stocks of manganese ore in bonded warehouses as of Sept. 30 amounted to 953,028 long tons, containing 472,763 tons of manganese.

ITALY COLLECTING OLD CANS TO CONSERVE TIN

Tin cans are being salvaged in Italy to recover their tin, according to a report from the American consulate in Milan.

Old cans are collected regularly and shipped to plants equipped with special machinery for removing paint and other impurities. They are then treated by an electrolytic process which produces a tin 97 to 98 per cent pure. Tin recovered by this method, it is pointed out, is suitable for casting purposes, in production of solder, and for uses where tin of great purity is not essential.

Tin required by Italian industries is substantial, imports of this item in 1938 amounting to approximately 4000 metric tons.

ICC CUTS INTERTERRITORIAL RAIL RATES ON CAST IRON

Interstate commerce commission, acting in the southern rate case, has reduced less-than-carload rates on cast iron pipe and fittings from the South to points in official territory, from 40 per cent to 35½ per cent of first class rates.

This case resulted from complaint of southern governors that rates between southern territory and northern points are discriminatory, by reason of being on a higher basis than northern interterritorial rates.

GOVERNMENT IRON, STEEL PURCHASES TOTAL $1,448,567

During the week ended Nov. 18 the government purchased $1,448,567.30 worth of iron and steel products under the Walsh-Healey act as follows: M. Mocoroa Arsuaga Inc., San Juan, P. R., $19,350; J. A. Carter Co. Inc., Los Angeles, $20,395; Dravo Corp., Philadelphia, $87,980; Riley Stoker Corp., Worcester, Mass., $381,934; Smith Corp., Portland, Oreg., $13,707; American Radiator & Standard Sanitary Corp., Denver, $185,660; American Rolling Mill Co., Middletown, O., $16,150; United States Steel Export Co., Washington, $14,000.84; Bethlehem Steel Export Corp., New York, $10,097.75; United States Pipe & Foundry Co., Philadelphia, $71,640; Kane Mfg. Corp., Kane, Pa., $15,164.13; Fort Pitt Bridge Works, Pittsburgh, $201,544.30; American Bridge Co., Boston, $13,028; Sheffield Steel Corp., Kansas City, Mo., $13,402.90; Bethlehem Steel Co., Bethlehem, Pa., $170,500; Pressed Steel Tank Co., West Allis, Wis., $34,374.40; Lukenweld Inc., Coatesville, Pa., $44,856; Bethlehem Steel Export Corp., New York, $53,456.28; Sheffield Steel Corp., Kansas City, Mo., $43,506.70 (estimated); and Widin Metal Goods Co., Garwood, N. J., $37,820.

AVIATION

PLANEMAKERS' PROFITS AT NEW PEAKS AS OUTPUT SOARS

■ PROFITS of the aircraft industry are following production to record heights. For the first nine months this year six leading builders report aggregate earnings of $19,515,479, best in their history, and up 68 per cent from $11,647,694 in like period of 1938.

With order backlogs well over $500,000,000 and output accelerating steadily, profits of most planemakers are expected to show substantial gains for some time.

Improvement in earnings unquestionably will help attract new capital, now urgently needed by some companies. Plans for a large stock issue were announced last week by Boeing Airplane Co., Seattle, latest major producer to enter the equity market for funds. Firm will increase to 1,250,000 its present authorized 800,000 common shares of $5 par.

Boeing recently negotiated several bank and Reconstruction Finance Corp. loans totaling nearly $5,500,000, with proceeds allotted to plant expansion, new machinery and equipment and working capital. The Wichita, Kans., plant of its Stearman Aircraft division is receiving several one-story assembly additions to cost $200,000. Facilities of the Boeing Aircraft division at Seattle may be augmented by lease of a nearby plant, discloses Philip G. Johnson, president.

A $225,000 capital stock issue is being marketed by Air Transport Mfg. Co. Ltd., Glendale, Calif. The company will extend its production facilities, proposing to manufacture a bimotored type transport.

Ground has been broken in a factory expansion program long planned by Vultee Aircraft division of Aviation Mfg. Corp., Downey, Calif. Requiring modern equipment costing $200,000, this project will involve new units totaling some 145,000 square feet, virtually doubling Vultee's capacity.

Navy department last week awarded contracts amounting to nearly $1,000,000 to launch construction of a $2,000,000 airplane engine and materials laboratory at the naval aircraft factory in Philadelphia. This is the only federal plant building planes for the government.

Factory Employment Growing

How rapidly the aircraft industry's payrolls are growing is revealed by Curtiss Aeroplane division of Curtiss-Wright Corp., Buffalo. This firm announces it will increase its employes from 3300 to 7000 within the next three or four months.

Puzzling for a time was the problem of delivering "cash-and-carry" planes to Canada. It was solved by using American pilots to fly craft to the northern line. After cash is duly received and title transferred, planes are hauled across the boundary by tractor, then flown away by Canadians. Delivered thus last week were the last of a number of training ships built for the dominion by North American Aviation Inc.

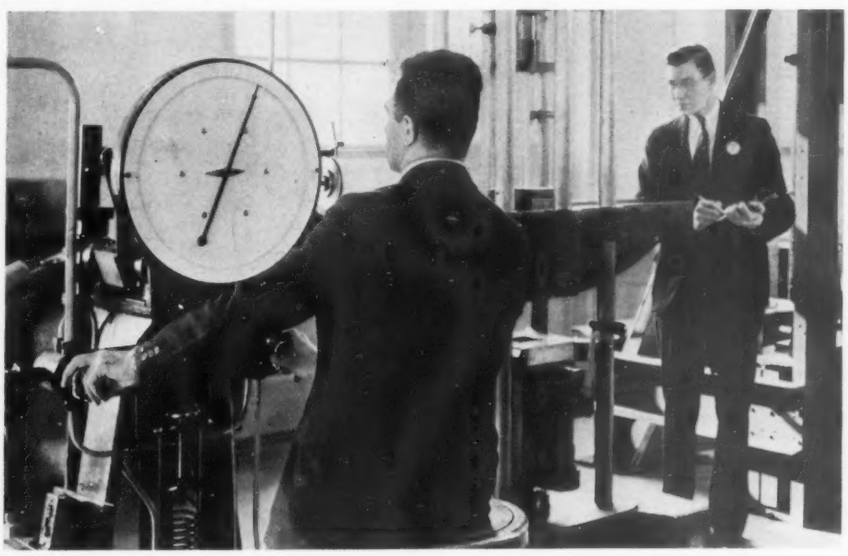
Now inspecting airplane factories in the United States are two Portuguese naval officers authorized to purchase here 12 bimotored bombing planes at cost of $75,000 each.

Under the civil aeronautics authority's 1940 construction program Worden-Allen Co., Milwaukee, is manufacturing 191 prefabricated steel buildings to house radio facilities along the nation's air routes. Of six types, the structures will shelter automatic transmission, receiving and power equipment.

Helicopters, rotary wing aircraft, may revolutionize aerial warfare, declares Capt. Boris Sergievsky, vice president, Helicopter Corp. of America, New York. He asserts this type of plane has great advantage over both ordinary craft and balloons since it can: Fly at high speed or hover motionless in the air; be made practically silent and invisible as it lacks noise-producing propellers and prominent fixed wings. In a laboratory near New York, Dr. George de Bothgat, who 17 years ago developed the world's first successful helicopter, is perfecting for Helicopter Corp. a new single-axis craft equipped with a special low-powered "inter-airscrew" engine.

Interesting carryover from woodworking practice to aircraft metalworking is Douglas Aircraft's use of high-frequency Sawyer motor routers in fabricating aluminum parts at its Santa Monica, Calif., plant. Operating with high-efficiency motors weighing much less than conventional types, these units are said to have increased routing speeds on aluminum from 4 feet up to 12 feet per minute.

Testing Strength of Aircraft Spar Section



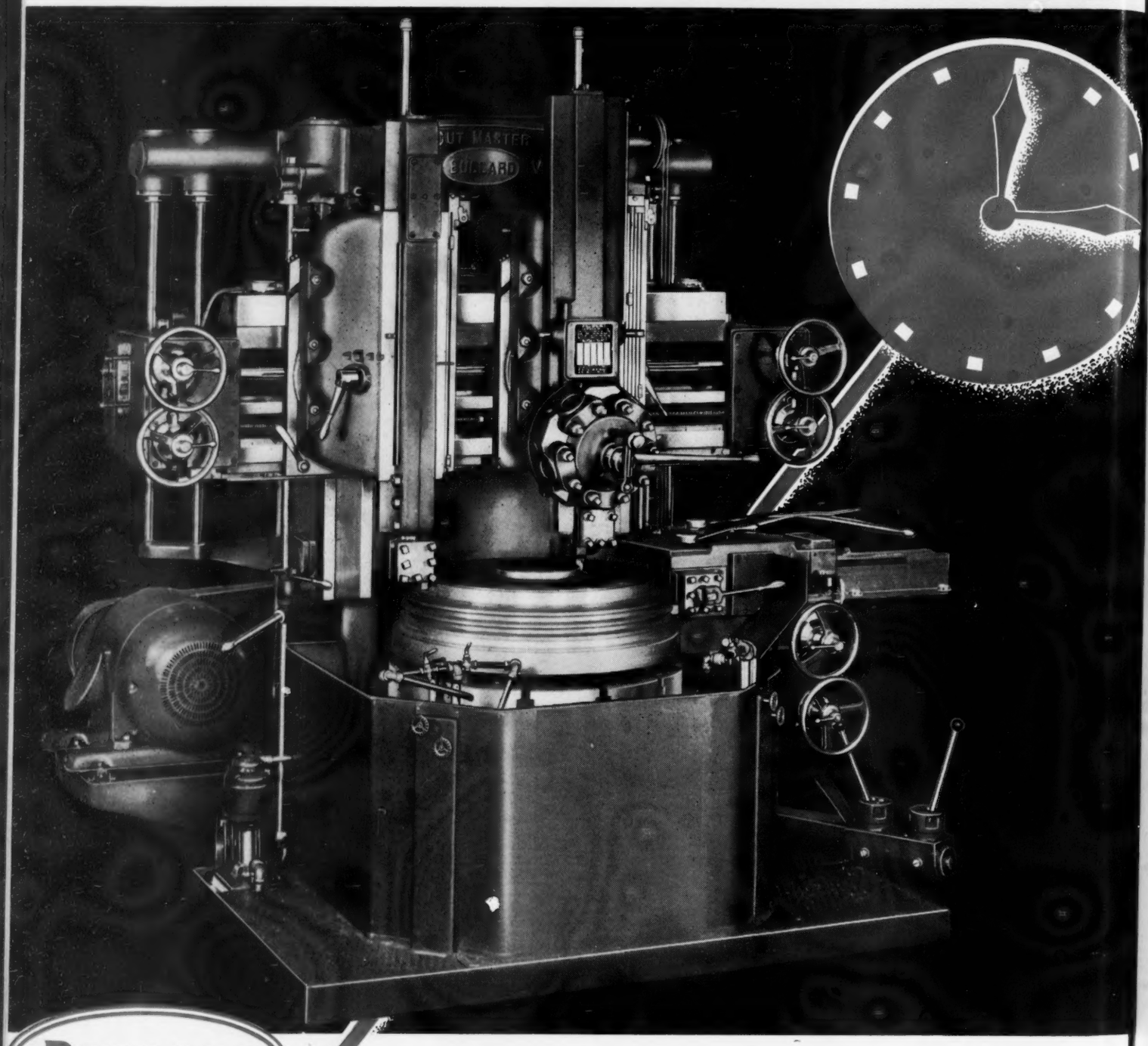
■ In its four-story engineering building at Middle River, Md., Glenn L. Martin Co. employs a great variety of special equipment for aeronautical research and testing. Illustrated is a spar section compression test on a machine registering deflections as slight as 1/100,000-inch

Survey Shows Buying Rests on Current Needs

■ American Supply and Machinery Manufacturers' Association Inc., Pittsburgh, recently sent a questionnaire to 300 industrial supply distributors asking their reasons for current buying from manufacturers. Of the first 232 answers received 86 per cent stated purchases were to bring up stocks, 56 per cent bought because of fear of possible shortages, 62 per cent from fear of higher prices and 88 per cent to fill orders for immediate consumption.

In relation to increased business from consumers 92 per cent attributed it to improved industrial demand for finished products, 54 per cent to war conditions, 60 per cent to shortage of material and transportation and 84 per cent to fear of higher prices.

CUT MASTER



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■ Naturally, Cut Master is faster. Any two heads can be cutting while the third is being brought into position. And with rapid power traverse in all directions on all heads, you can save time between cuts, as easily as on cuts. However, if you can't use three heads, there are five other head combinations obtainable. Ask about these combinations.

Cut Master is something entirely new in Vertical Turret Lathes, in the speed and sustained accuracy of its operation. The "high points" given here are only a few of a great number, all contributing their part toward the quick acceptance of these new Vertical Turret Lathes. Send for the complete story, and be sure to tell us whether you are most interested in 30", 36", 42", 54", or 64" machines.

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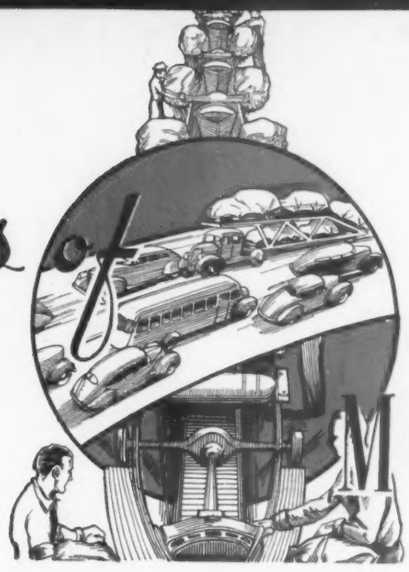
CUTS FASTER

Mirrors of MOTORDOM



By A. H. ALLEN
Detroit Editor, STEEL

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DETROIT

■ EARLY last week, when it appeared no solution could be found to the deadlock between Chrysler and the UAW-CIO, a letter was handed to James F. Dewey, federal labor conciliator, as he came out of the conference room at the Chrysler Institute of Engineering. Opening it he discovered two pennies and a note which read: "I am a strong supporter of the UAW-CIO and a Chrysler workman. I am down to my last two cents, which are enclosed. Please give one to Mr. Weckler (Chrysler v. p.) and one to Mr. Thomas (UAW-CIO president)." Mr. Dewey followed out these instructions and reported "no comment" from either of the officials.

Credit for breaking the *impasse* probably should be given to CIO vice president Phil Murray, who was rushed to the scene of negotiations after they bogged down over introduction of the "foremen" issue. The latter resulted from receipt of a telegram by the Chrysler management from a CIO local purporting to represent foremen in Chrysler plants and asking for bargaining conferences. The management naturally was horrified at such a turn of events, since foremen are the management's first line of contact with men in the plants, and as management representatives have always been excluded from collective bargaining agreements.

Union Gains Little

This attempt of the UAW-CIO to sit on both sides of a conference table by taking over representation of supervisory forces was a serious tactical error which the union sought to correct by withdrawing the request from the "foremen's local." But Chrysler demanded more certain assurances than the mere withdrawal of an issue, so the call went out for Murray. After his arrival, a settlement was not long in coming and at midnight Tuesday Mr. Dewey flashed the news to reporters a statement was being readied.

Analysis of the new contract drawn up to cover the next 12 months reveals a general wage increase of 3 cents per hour to all employes will be made, together with adjustments in wage rates in Chrysler plants in Marysville, Mich., and Newcastle, Ind., and upward revision of wage classifications among skilled workers, in all costing the corporation $5,000,000 annually.

No "Union Shop"

Beyond this, the unionists won nothing, and in return it must guarantee against any further action in behalf of foremen. Minor changes will be made in seniority regulations, and 125 men discharged during the Dodge slowdown strike will be reinstated. To settle major disputes in bargaining procedure, a four-man reviewing board will be set up, comprising two men from the union and two from the corporation, but none of them from plants or union locals in which the dispute is centered. Similar to the adjustment board functioning in labor disputes in the railroad industry, this board will have the mandatory power to settle disputes.

Standards of production will continue to be the function of management, with disputes over production rates settled through the regular grievance machinery. The contract contains no mention anywhere of a "union shop," although the UAW-CIO is granted exclusive bargaining power in 11 of Chrysler plants.

Any form of strike called by the union will automatically nullify the contract, and the union agrees not to call strikes until exhausting all available grievance machinery. Bargaining procedure will remain substantially as it was, with foremen the key intermediaries between workmen and the management.

A movement among idle Chrysler employes to return to their jobs had made good headway prior to announcement of the contract. Tuesday over 400 reported at the Dodge plant and worked a full shift. It is understood that if no agreement was reached by Friday, wholesale marches back to the plants had been organized and would have started. After raining bricks and stones on returning employes at the Dodge plant Monday, UAW pickets refrained from violence Tuesday.

Perhaps more than one Chrysler worker is now figuring up just what his 54-day vacation has cost him and what benefits the UAW-CIO has achieved for him. K. T. Keller, Chrysler president, states that since March of this year, labor disputes have cost employes 28,000,000 man-hours of work or wages of $27,600,000, which is an average of $476 each for 58,000 employes. A general wage increase of 3 cents per hour is equivalent to $1.20 per week or $54 per year, figuring the work year to amount to 45 weeks. Thus, the average employe will have to work for the next eight years and nine months to earn income just equivalent to what he would have earned without a strike. In other words, he will begin to feel the effects of his wage increase about August, 1948—if he can hold out that long. Of course, this does not take into consideration increases realized through improvement of classification among skilled workmen, but these are not available to the average employe.

■ ALARMED at the severity of current labor friction and its accompanying smear on the civic reputation of "dynamic Detroit," and seriously disturbed by the mounting numbers of industries moving away

from the city, a group of local manufacturers and business men has formed the Detroit Council for Industrial Peace, with a long-range program for outlawing Detroit's industrial strife and confusion.

The council has published two full-page newspaper advertisements outlining its purposes and will follow them up with further statements. Coupons are attached to enlist interested persons in the movement. Identity of the 100 organizations sponsoring the movement is being concealed at first, but once the movement gets under way, it is hoped all Detroit industries will be anxious to get on the bandwagon.

Formation of this new group at the height of the Chrysler strike is reminiscent of community organizations started at the time of the automobile strikes in 1937. These included the Citizens of Michigan, We Americans, American Labor League, Independent Association of Automobile Employes and others.

Reports from the industrial peace council indicate a good measure of popular support, with newspaper coupons mounting up into the thousands and with numerous offers of financial and moral assistance.

A further warning was sounded to Detroit business interests by E. T. Weir of the National Steel Corp., who spoke here last week before the Economic club. He pointed out that "no natural disaster can equal the destructive effect of continuing labor dissension . . . Communities have been ruined by strikes, and certainly no one wishes that fate for Detroit."

■ SAD plight of a group of local executives, affiliated with the automobile and other industries, is being told around town. Recognizing the boom in aircraft manufacture which materialized after declaration of war in Europe, they pooled funds to invest in a new airplane manufacturing business near Detroit. This company had perfected an all-metal primary trainer ship and a government order for 550 at $3000 each was practically "in the bag." Good connections had been established at Washington, a new plant building had been equipped with the necessary jigs and fixtures and the investors were almost on the point of banking their profits. To their dismay, however, when bids were opened in Washington, the contract was placed with another builder who proposed to supply wood and canvas biplanes at a cost of well over $6000 each.

After preliminary consternation had subsided, analysis of the contract forms was made and in the fine print the phrase was discovered requiring the planes to be of a "tried and tested" type. Despite preliminary wind tunnel tests and other stress determinations made at the University of Michigan on the all-metal plane, it apparently could not be established to the satisfaction of the government that the planes were "tried and tested."

Buick continues in high gear on domestic deliveries, moving 9270 units in the second ten-day period of November to bring the month's total to 18,907. Unfilled orders of 28,000 units remain on dealers' books.

Packard celebrated its fortieth birthday Nov. 6, the first Packard car having been built on this date in 1899 at Warren, O. The first Packard, with a price tag of $1250, was a single-cylinder, 9-horsepower machine, featuring among other things automatic spark advance. The car is still in good running condition and is enshrined in a bronze and glass case in the lobby of the James Ward Packard engineering laboratory at Lehigh university, Bethlehem, Pa.

Local pressed steel fabricator plans shortly to introduce a new line of enameled steel plumbing ware similar to that supplied by Briggs Mfg. Co. It is understood arrangements have been concluded with a large mail order house to furnish its requirements in this type of household equipment.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1937	1938	1939
Jan.	399,186	226,952	356,950
Feb.	383,900	202,597	317,517
March	519,022	238,447	389,489
April	553,231	237,929	354,263
May	540,377	210,174	313,214
June	521,153	189,402	324,235
July	456,909	150,450	218,478
Aug.	405,072	96,946	103,343
Sept.	175,630	89,623	192,672
Oct.	337,979	215,286	323,017
10 mos.	4,292,459	1,857,806	2,893,178
Nov.	376,629	390,405	.....
Dec.	347,349	406,960	.....
Year	5,016,437	2,655,171	.....

Estimated by *Ward's Reports*

Week ended:	1939	1938†
Nov. 4	82,690	75,830
Nov. 11	86,200	86,094
Nov. 18	86,700	96,735
Nov. 25	72,520	84,730
Dec. 2	93,638	97,795

†Comparable week.

	Week Ended Dec. 2	Nov. 25
General Motors	48,230	40,240
Chrysler	4,575	.....
Ford	24,665	18,600
All others	16,168	13,680

"No Permanent Profit in War"

■ "WAR is the one thing the industrialist knows he doesn't want," declared Raoul E. Desvernine, president, Crucible Steel Co. of America, New York, before the Washington Society of Engineers' annual banquet, Hotel Mayflower, Washington, Nov. 29.

That there can be no permanent profit from war was substantiated by Mr. Desvernine in an analysis of historical economic consequences of wars of the past 150 years. He concluded: "Every major war period has been followed by a generation of economic disturbances, shaken confidence, obscuration of objectives and declining values arising out of the destruction of real wealth by the war itself and the disruption of confidence in the feasibility of sane progress, enterprise and initiative."

"War Doesn't Pay"

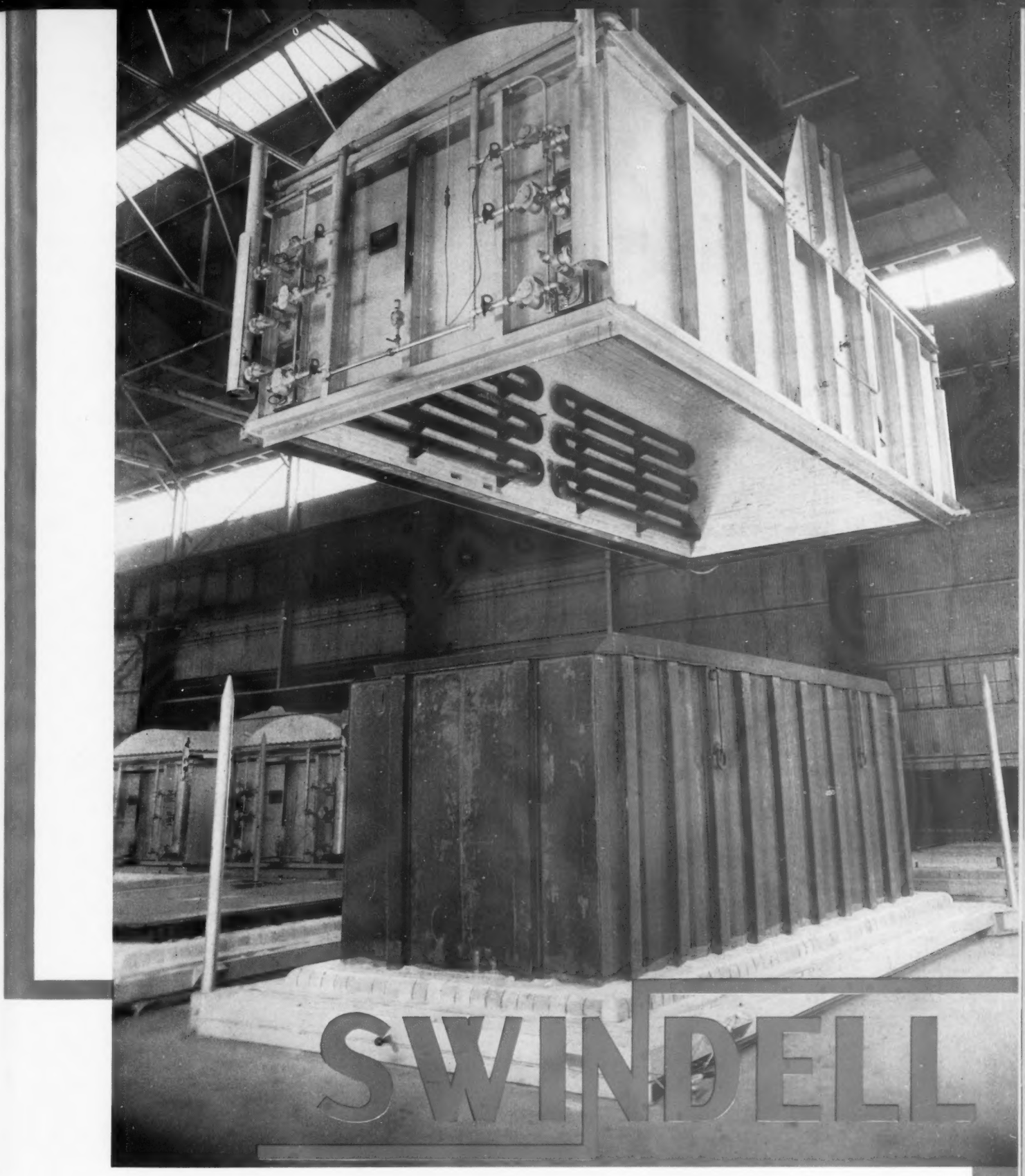
Industry's World war experience was reviewed in more detail. Normal economic processes, he reminded, were distorted and a productive peace-time economy transformed into a destructive war-time economy. All efforts were concentrated on one job. Productive capacity was expanded rapidly and often wastefully. Prices, wages, living costs increased. An artificial prosperity resulted.

When peace returned, industry was forced to turn another somersault. Production had to be readjusted to post-war consumer demands. Foreign competition, absent during the war, reappeared. Employment of labor in other than wartime pursuits had to be quickly provided. Wages could not be reduced immediately as labor had accustomed itself to a high scale based on a higher standard and cost of living.

The war's maladjustments, Mr. Desvernine continued, were first revealed in the 1920 depression, in the violent decline in the wholsale commodity index from 167 in May, 1920, to 93 in July, 1921, and in the soaring of business failures.

"Much of the apparent profit realized from the abnormalities of war —that is such as remained after the payment of tremendous income and excessive profit taxes and after forced capital expenditures for plants and equipment to meet the artificial and temporary requirements of war—was rapidly absorbed in the physical readjustment to a peace-time economy.

"On net balance, from a long range point of view, the war proved bad business."



The simplicity of the furnace and base construction together with the recirculating radiators are contributing factors to the ease of operation, obtaining a product of high quality and the best fuel consumption. These furnaces are operated with any kind of clean gas.

SWINDELL-DRESSLER CORPORATION

PITTSBURGH PA.

Activities of Steel Users, Makers

■ ALLEGHENY Ludlum Steel Corp. has purchased the Buffalo River road property which Ludlum Steel Co. leased from the Buffalo Electric Furnace Co., prior to Ludlum's merger with Allegheny Steel Co. The corporation has been manufacturing stainless steel castings at the plant. Another electric furnace and additional equipment will be installed.

♦

Mossman-Yarnelle Co., Fort Wayne, Ind., has been appointed welder and electrode agent for Harnischfeger Corp., Milwaukee.

♦

Pullman-Standard Car Mfg. Co., Chicago, has acquired the Hammond, Ind., plant of Southern Wheel Co., unit of American Brake Shoe & Foundry Co.

♦

Acme Steel Co., Chicago, has begun a plant expansion program, involving expenditure of $1,250,000 to $1,300,000. Most of this will be for cold rolling and scale removing equipment.

♦

T. B. Wood's Sons Co., Chambersburg, Pa., has appointed the following distributors for its line of power transmission machinery: Louisville Mill Supply Co., Louisville, Ky., and M. D. Larkin Co., Dayton, O. The company has also established a warehouse in Newark, N. J., with Henry D. Clark, as district representative, to serve distributors in northern New Jersey and the New York metropolitan area.

♦

Ferro Enamel Corp., Cleveland, is installing a new porcelain enameling furnace for Barrows Porcelain Enameling Co., Cincinnati, O., and one for Tyler Fixture Co., Niles, Mich.

♦

Turner Engineers Inc., Springfield, Vt., will be formed on or about Jan. 1 to specialize in machine tool engineering. Albert Turner, vice president and treasurer, has had 40 years experience in the machine tool field.

♦

Ingersoll-Rand Co. has been awarded contracts for the condensers, condenser pumps and boiler feed pumps for a 19,405-ton all welded tanker to be built for Atlantic Refining Co. at the Sun Shipbuilding & Dry Dock Co. yards, Chester, Pa.

♦

Levand & Co. has opened offices at 518 Fidelity building, Cleveland, to deal in iron and steel scrap, under the management of Jack Levand who until recently was assistant manager of the Cleveland office of Summer & Co.

♦

Carrier Corp., Syracuse, N. Y., has been given a contract by Woodward Iron Co., Woodward, Ala., covering air-conditioning equipment for a second blast furnace, duplicating that placed in service recently on another furnace, furnished by the same company. The first installation was described in STEEL, Nov. 20 and 27.

♦

Philip M. McKenna, of McKenna Metals Co., Latrobe, Pa., announces that George H. Alexander Machinery Ltd., Birmingham, England, has obtained an option on the McKenna patents to manufacture Kennametal in Great Britain. Kennametal is the name of a series of new steel-cutting carbide tool compositions.

Corrugated Inner Covers for Annealing Boxes

■ Wean Engineering Co. Inc., Warren, O., has been licensed by American Rolling Mill Co., to have manufactured and sell corrugated inner covers for annealing boxes, under United States patents Nos. 2,069,768, 2,074,093, 2,078,718, 2,105,750, Canadian patents Nos. 367,066, 369,348, 367,067, and other pending United States and Canadian patent applications. The Wean company is considering having fabricators in the United States and Canada do the manufacturing for it under this license.

Photo shows these new inner covers, with the outer gas-fired covers at the right background.

Southern Association Holds First Meeting

■ Southern Blast Furnace and Raw Materials association met recently at Hotel Thomas Jefferson, Birmingham, Ala., for the first time since its organization last August.

C. L. Bransford, district manager, Republic Steel Corp., and president of the association, presided. He pointed out that Chicago and Eastern States Blast Furnace and Coke associations have long proved their usefulness and that it is proper the South have a similar organization. Since the Birmingham area produces all raw materials requisite for pig iron, the southern association also includes representatives of coal and ore mines. It has more than 80 members.

J. E. Urquhart, general manager Woodward Iron Co., Woodward, Ala., principal speaker of the evening, described the air-conditioning equipment installed at one of his company's furnaces.

Officers include Mr. Bransford; Mr. Urquhart, vice president; Francis Crockard, secretary-treasurer, and G. M. Harris, C. S. Lawson, Fred Osborne, J. M. Spearman, A. G. Overton and Ben Davis, directors.

Decatur Casting Co. Open House Attracts 2236

■ Open house held by Decatur Casting Co., Decatur, Ind., Nov. 25, attracted 2236 visitors. Company employes and their families, engineers, designers, and buyers, as well as representatives of other foundries and the Gray Iron Founders' society were present.

Inspection of production facilities, especially a vertical continuous core oven recently installed, were major features. Considerable emphasis also was placed upon safety equipment provided for protection of employes. Raw materials, coremakers' working equipment, finished castings, and products fabricated from the castings by other concerns were exhibited.

"New Deal Balks Sound Recovery"

■ DEVELOPMENT of sound economic recovery in United States is prevented by government spending and the effect of New Deal "theories" on business, stated Ernest T. Weir, chairman, National Steel Corp., and president, American Iron & Steel institute, at a meeting of the Economic Club of Detroit in the Book Cadillac hotel, Detroit, Nov. 27.

Characterizing the present business situation as unsound despite the current high rate of activity, the speaker said stimulation has come largely from anticipation of European war buying. Permanent recovery, he pointed out, depends upon a sustained high volume of private investment in productive enterprise.

Poor earnings of American business firms has shut this investment off in recent years, Mr. Weir declared, by depriving business organizations of the funds which they normally reinvest in plant and equipment and also by destroying the incentive which attracts investors' savings.

"Wagner Act Causes Labor Trouble"

Heavy taxation, plus disruption of business by new government regulation and controls, is directly responsible for business losses and low profits, the speaker contended. Citing the Wagner law and its administration under the national labor relations board as an example of the adverse effect of government "theory" upon business, Mr. Weir charged that instead of eliminating strikes it has been a major factor in producing the greatest period of labor disturbance in the history of the country.

Referring to the Chrysler strike, he said: "Detroit has reason to be keenly aware of the effect of this theory in the vital field of employer-employe relationships."

Since 1940 is an election year, Mr. Weir predicted, the national administration will neither reduce spending nor increase taxes to produce revenue sufficient to cover the spending. Instead an effort will be made to increase the national income to the point where the present rate of taxation will produce a much higher federal income. For this reason, he said, "experiments are being soft-pedaled; mysterious submarines have taken the place of economic royalists as threats to the national welfare, and according to Washington observers, plans are being made to give business a 'shot in the arm' if there is any sign of contraction in the present rate of business activity."

Artificial handicaps have affected, in one way or another, every phase of business, Mr. Weir said. Only business men, who are in daily contact with governmental experimentation know how it has multiplied the difficulties of business and destroyed its incentives. The results, however, he pointed out, may be plainly seen by anyone who cares to look at them.

"There is an absurd contradiction between the main lines of economic policy that have been thrust on the country by the government planners. With one hand they have acted to demoralize the economic system and keep it stalled at depression levels. With the other they have tried to stimulate it to prosperity activity by the device of 'pump-priming.'"

We have had government by theory and experiment for seven of the past ten years, continued Mr. Weir. Per capita income, he said, has declined from $665 in 1929 to $583 in 1937, the best year since 1929, a drop of 20 per cent, while federal, state and local taxes have increased until they take more than 20 per cent of the national income. Mr. Weir expressed the opinion that America could have the greatest period of progress in its history if only we had a government interested in recovery and economy rather than a "planned economy."

In commenting on the European war he said the country can be thankful for the lull in war emotion and war talk in United States. He cautioned, however, that extremely active war in Europe would create the danger of war hysteria here.

"Let us profit by experience," he declared, "and remember that while the country was solidly for neutrality as late as November 1916, American troops were on the march April 1917. We must not let that happen again."

Steel Replaces Wood in Train Running Boards

■ Designed to diminish snow and ice hazards to railroaders atop moving trains, studded steel grill running boards and brake steps for freight cars are winning approval of railroad officials and unions. Developed by Tri-Lok Co., Hanlon-Gregory Galvanizing Co. subsidiary, Pittsburgh, the new running boards already are used by 38 United States and two Canadian roads.

A. O. Smith Corp., Milwaukee, will manufacture 10,000 of the boards and steps for Tri-Lok's agent, Apex Railway Products Co., Chicago. Tri-Lok will start production in its Pittsburgh plant early next year. In Canada the equipment is made by Hamilton Steel Car Corp., Hamilton, Ont.

The steel running boards replace the older wooden boards. Studded with sharp points, the steel boards can be walked upon with maximum safety in any kind of weather. Neither ice, nor snow, nor rain causes them to become slippery.

Sponsors estimate 20,000 tons of steel would be required to manufacture the boards and steps for all railroads in the United States. Each running board weighs 400 pounds.

Editorial

The Chrysler Strike

■ CHRYSLER CORP. announces that on Nov. 20 it received a telegram, signed by "Ralph N. Branson, chairman, Dodge Truck Division, United Foremen and Supervisors Local Industrial Union No. 918, C. I. O.," reading as follows:

"In accordance with the provisions of the national labor relations act we, the shop supervisory employes of the Dodge truck plant of Dodge Brothers division of Chrysler Corp., have organized ourselves into a bona fide labor union, namely the United Foremen and Supervisors local industrial union No. 918 Dodge Truck division, and in further accordance with the act, and inasmuch as we represent a clear majority of said employes, we now ask that the management of the Dodge Truck plant meet with the duly elected bargaining committee of said employes in order to carry out the collective bargaining provisions of the act. Proof of our membership claims may be arranged at such meeting. May we expect your answer at once."

Unionized Foremen Would Put Union On Both Sides of Bargaining Table

As was pointed out by K. T. Keller, president, Chrysler Corp., such an arrangement would put the CIO on both sides of the collective bargaining table. It would violate the general understanding that foremen should represent management in dealing with employes and not be affiliated with employes' representatives. The company's agreement of April, 1937, signed by John L. Lewis, excluded foremen and assistant foremen. The national labor relations board, in certifying the CIO union as exclusive bargaining agent in eleven Chrysler plants, excepted foremen and supervisory forces from the collective bargaining unit.

So the demand for recognition of a CIO union of plant foremen and supervisors represented a revolutionary development. It aimed at complete CIO control.

In a letter to the editor of the *New York Times* recently, defending the record under the national labor relations law, Senator Robert F. Wagner stated that "successful operation under agreements reached under this law depends on patience, mutual confidence and a responsible appraisal of mutual problems by the parties themselves. These qualities cannot be legislated into existence—they must develop with experience and the exercise of responsibility."

Labor Leaders Have Too Much License Under Present System

While it is true that these qualities cannot be legislated into existence, it is difficult to conceive of the existing national labor relations law and its administration as calculated to encourage cultivation of them.

Although the demand subsequently was withdrawn, it must be regarded as another of the many manifestations of the unwisdom of placing too much power in the hands of professional leaders of organized labor. Too many of them follow a give-an-inch, take-a-mile policy with resulting abuses that generally are recognized as such. Public resentment already has led to remedial labor legislation in a number of states and communities. The Chrysler case surely gives added impetus to indignation against ruthless and arrogant labor leaders, and to determination that they must be curbed.

The BUSINESS TREND

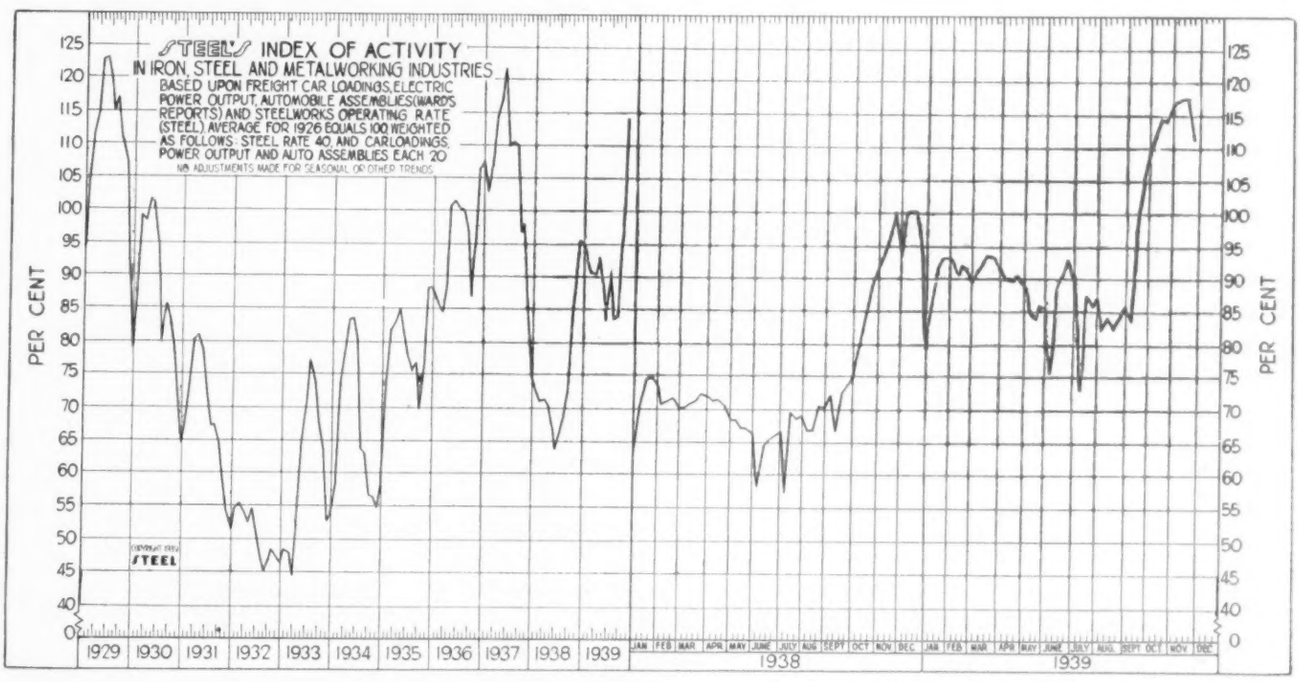
Activity Index Reflects Holiday Interruption

■ RECORDS of business for the week ended Nov. 25 are distorted somewhat by the interruption of activity in most states occasioned by the observance of Thanksgiving day. Due to this factor, together with the expected seasonal decline in revenue freight carloadings, STEEL's index of activity in the iron, steel and metalworking industries receded 5.9 points to 111.4. In the comparable week last year the index eased 6.5 points to 93.9, while in the corresponding weeks of 1937 and 1936 the index declined 12.2 and 4.7 points respectively.

Contributing to the drop in the index for the latest week were declines in three of the four business indicators from which it is composed. In the case of electric power output and automobile production the major factor was the holiday interruption. The drop of 94,888 cars in revenue freight carloadings was due largely to the same cause, although a seasonal curtailment in freight traffic is to be expected at this time.

The close-to-capacity steelmaking operations continued unabated at 93.5 per cent during the week ended Nov. 25, and are expected to remain near the current level through the remainder of the year. At this time last year the national steel rate stood at 62 per cent, in 1937 the rate was at the 31.5 per cent level and in 1936 steelmaking operations were placed at 75.5 per cent.

Persistent requests for early deliveries from machine tool, railroad equipment and automobile manufacturers would seem to indicate that inventories of finished steel are not being accumulated to an excessive degree. Order backlogs in these industries are said to exceed


STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL) AVERAGE FOR 1926 EQUALS 100 WEIGHTED AS FOLLOWS: STEEL RATE 40 AND CARLOADINGS, POWER OUTPUT AND AUTO ASSEMBLIES EACH 20
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS
PER CENT
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939
1938
1939

STEEL'S index of activity declined 5.9 points to 111.4 in the week ended Nov. 25:

Week ending	1939	1938
Sept. 9	83.7	66.8
Sept. 16	97.5	72.9
Sept. 23	103.0	74.0
Sept. 30	107.9	74.9
Oct. 7	112.5	78.9
Oct. 14	113.9	84.3
Oct. 21	113.6	88.7
Oct. 28	116.2	91.4
Nov. 4	117.1	93.4
Nov. 11	117.2	95.9
Nov. 18	117.3†	100.4
Nov. 25	111.4	93.9

†Revised.

Mo. Data	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Jan.	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Feb.	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
March	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
April	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5
May	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2	122.9
June	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
July	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
Aug.	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4	116.9
Sept.	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7	110.8
Oct.	114.0	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8	107.1
Nov.	....	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0	92.2
Dec.	....	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3	78.3

the top figures during the 1937 boomlet and in some instances nearly equal the 1929 peak. While volume of new business during November receded substantially from the September-October levels, unfilled orders are said to be sufficient to maintain current rate of operations at least through the remainder of this year.

Revenue freight carloadings eased more than seasonally during the week ended Nov. 25. Freight traffic in that week totaled 676,516, a decline of 94,888 cars from the preceding week, according to the Association of American Railroads. In the corresponding holiday week a year ago freight carloadings also declined approximately 95,000 cars to 562,084.

Observance of the Thanksgiving holiday, resulted in general lowerings of output in the automotive industry to 72,520 units, during the week ended Nov. 25. However, in almost every instance the reduction was less than a proportionate fifth of the preceding week's total. In the week ended Nov. 18 assemblies amounted to 86,700, while in the comparable week last year output was 84,730 units. With the resumption of operations at Chrysler plants, automobile production during the weeks immediately ahead should attain new high levels for the current fall upturn. There is still an industry-wide order backlog of substantial proportions, resulting in delay of retail deliveries from three to ten weeks.

Total output by the electric light and power industry of the United States for the week ended Nov. 25 was 2,481,882,000 kilowatt-hours, compared with 2,183,807,000 kilowatts in the like 1938 week, according to the Edison Electric institute.

Despite the falling off in new business placed during November from the abnormally high levels prevailing throughout October and September, there is little evidence that industrial production through the remainder of the year will recede substantially from the current high levels. What will develop during the early months of 1940 can only be surmised at this time, with so much depending on the extent of purchases from belligerents as well as the neutral powers. To date the volume of our foreign trade has suffered from the European war, but more active foreign buying appears imminent.

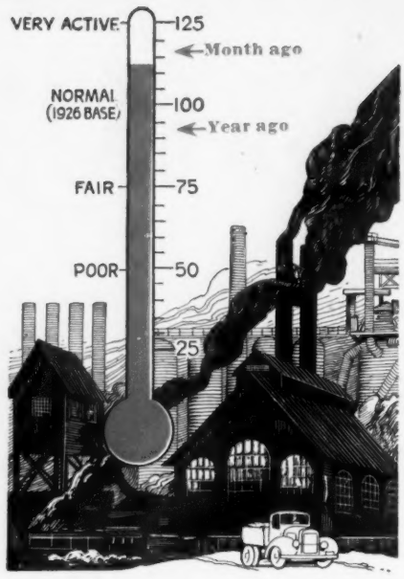
Where Business Stands

Monthly Averages, 1938 = 100	Oct., 1939	Sept., 1939	Oct., 1938
Steel Ingot Output	229.4	187.1	132.6
Pig Iron Output	225.9	185.0	128.9
Freight Movement	147.0	136.1	123.5
Automobile Production	146.0	86.8	97.3
Building Construction	98.0	121.3	134.3
Wholesale Prices	101.0	100.6	98.7

Industrial Weather

TREND:

Sidewise



The Barometer of Business

Industrial Indicators

	Oct., 1939	Sept., 1939	Oct., 1938
Pig iron output (daily average, tons)	116,900	95,802	66,694
Iron and steel scrap consumption	3,974,000	3,282,000	2,393,000
Foundry equipment new order index	220.4	184.4	87.9
Finished steel shipments	1,218,545	985,050	663,287
Ingot output (daily average, tons)	207,455	169,252	119,921
Dodge bldg. awards in 37 states (sq. ft.)	$261,796,000	$323,227,000	$357,698,000
Automobile output	323,017	192,672	215,296
Coal output, tons	45,255,000	38,150,000	34,989,000
Nat'l Ind. Conference board inventory indices:†			
Raw materials	91.0	89.5	108.6
Semifinished goods	99.0	106.8	111.7
Finished goods	108.1	111.7	112.2
Business failures; number	916	758	997
Business failures; liabilities	$16,140,000	$9,402,000	$13,219,000
Nat'l Ind. Conf. board (25 industries, factory):			
†Av. wkly. hrs. per worker	38.2	37.9	36.2
†Av. weekly earinngs	$27.58	$27.29	$25.73
Cement production, bbls.	12,538,000	11,937,000	11,556,000
Cotton consumption bales	686,936	624,902	543,857
Car loadings (weekly av.)	843,736	780,663	708,396

†September, August and September respectively.

Foreign Trade

	Sept., 1939	Aug., 1939	Sept., 1938
Exports	$288,573,000	$250,839,000	$246,335,000
Imports	$181,461,000	$175,756,000	$167,592,000
Gold exports	$15,000	$13,000	$16,000
Gold imports	$326,089,000	$259,934,000	$562,382,000

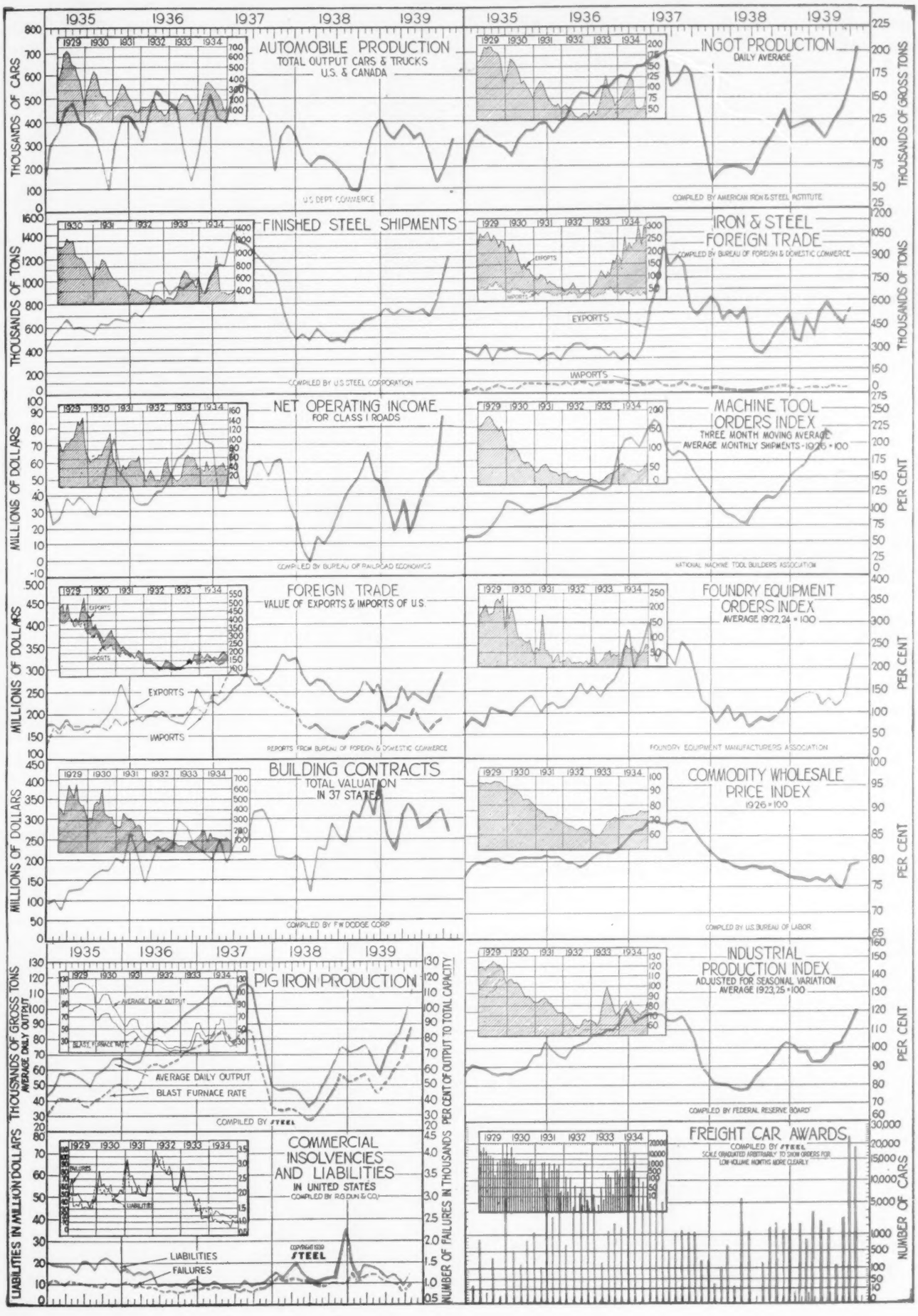
Financial Indicators

	Oct., 1939	Sept., 1939	Oct., 1938
25 Industrial stocks	$194.82	$195.86	$189.69
25 Rail stocks	$25.84	$24.91	$23.95
40 Bonds	$72.75	$70.56	$68.41
Bank clearings† (000 omitted)	$23,820,000	$22,596,000	$24,011,000
Commercial paper rate (N. Y., per cent)	⅝—¾	⅝—¾	⅝—¾
*Com'l. loans (000 omitted)	$8,521,000	$8,350,000	$8,327,000
Federal Reserve ratio (per cent)	85.5	85.0	83.2
Capital flotations:			
New capital	$335,860,000	$41,221,000	$166,908,000
Refunding	$403,680,000	$133,151,000	$599,280,000
Federal gross debt. (millions of dollars)	$41,036	$40,858	$38,426
Railroad earnings	$101,616,477	$86,435,178	$68,594,809
Stock sales, New York stock exchange	23,733,664	57,080,610	41,560,490
Bond sales, par value	$170,344,800	$481,361,375	$185,452,075

*Leading member banks Federal Reserve System.
†September, August and September respectively.

Commodity Prices

	Oct., 1939	Sept., 1939	Oct., 1938
Steel's composite average of 25 iron and steel prices	$37.62	$36.67	$36.48
U. S. Bureau of Labor index	79.4	79.1	77.6
Wheat, cash (bushel)	$1.03	$1.04	$0.81
Corn, cash (bushel)	$0.65	$0.72	$0.63


AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS U.S. & CANADA
U.S. DEPT. COMMERCE
INGOT PRODUCTION
DAILY AVERAGE
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
FINISHED STEEL SHIPMENTS
COMPILED BY U.S. STEEL CORPORATION
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
NET OPERATING INCOME
FOR CLASS I ROADS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS - 1926 = 100
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922,24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
BUILDING CONTRACTS
TOTAL VALUATION IN 37 STATES
COMPILED BY F.W. DODGE CORP
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
COMPILED BY U.S. BUREAU OF LABOR
PIG IRON PRODUCTION
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
COMPILED BY STEEL
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923,25 = 100
COMPILED BY FEDERAL RESERVE BOARD
COMMERCIAL INSOLVENCIES AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES
FAILURES
COPYRIGHT 1939 STEEL
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW-VOLUME MONTHS MORE CLEARLY
THOUSANDS OF CARS
THOUSANDS OF TONS
THOUSANDS OF GROSS TONS
MILLIONS OF DOLLARS
PER CENT
LIABILITIES IN MILLION DOLLARS
THOUSANDS OF GROSS TONS AVERAGE DAILY OUTPUT
NUMBER OF FAILURES IN THOUSANDS
PER CENT OF OUTPUT TO TOTAL CAPACITY
NUMBER OF CARS

3 in 1

■ ADVANCED press shop technique makes possible forming in an integral unit front fender and shroud, hood side and headlamp body for 1940 Buick models. This "three-in-one" stamping (STEEL, Oct. 16, p. 42) results in a strong and rigid assembly and eliminates joints which in conventional manufacture require lining up during assembly and sealing to prevent water leaks and subsequent rust.

First operation is the forming of a blank 54 x 95 inches and 0.078-inch thick. This is followed by roller leveling, after which blanks are given the first draw in a large Hamilton press, Figs. 1, 2, 3. Stamping then is routed to a press fitted with two separate die stations, Fig. 4, one rough-trims and the other redraws rear end.

The next press has a bed accommodating four separate die stations. First station takes the finish redraw

Fig. 1 (Top)—Drawing dies weighing 44 tons which perform first operation. Fig. 2 (Center)—A 75-pound steel sheet blank is positioned in the dies. Fig. 3 (Bottom)—Removing stamping from first drawing operation. Elongation reaches 50 per cent at nose of headlamp shell where the steel is stretched more severely

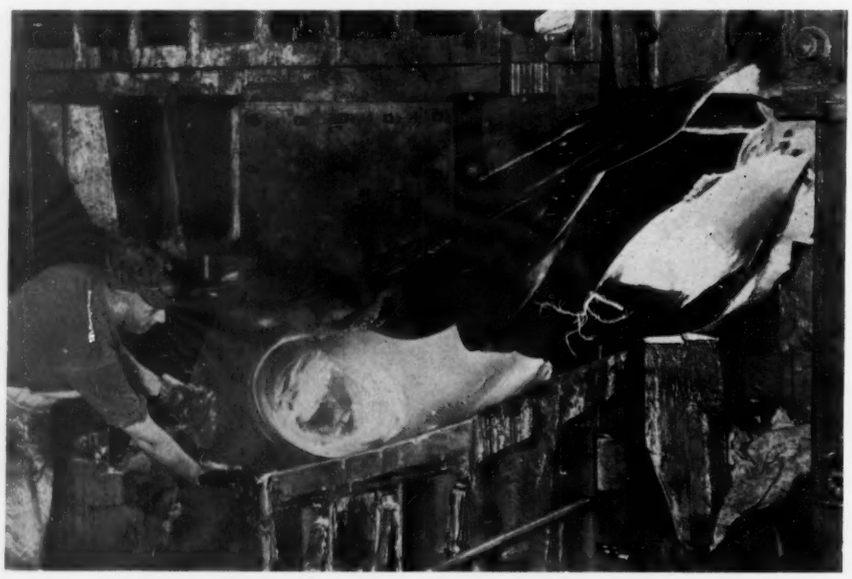
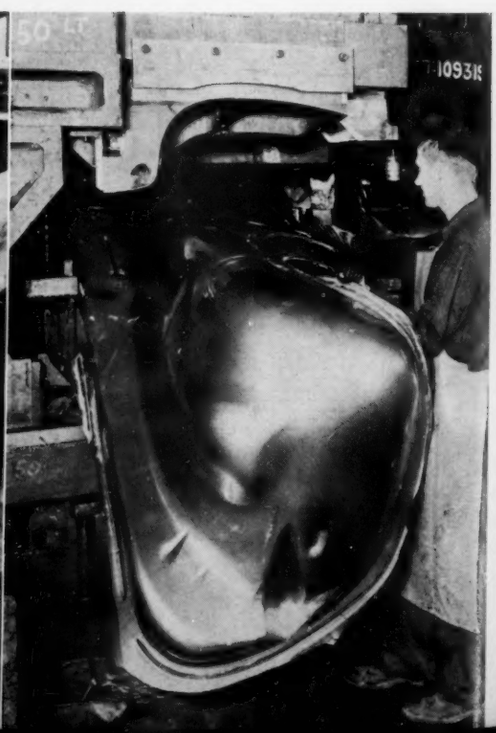


Fig. 4 (Below)—Two-station Toledo press trims rear of stamping, pierces and trims louvre openings, rough pierces lamp opening, reforms radius of lamp opening and embosses parking light housing



Stamping

One-piece construction incorporates fender, headlamp shell and portion of hood to eliminate all joints and strengthen unit

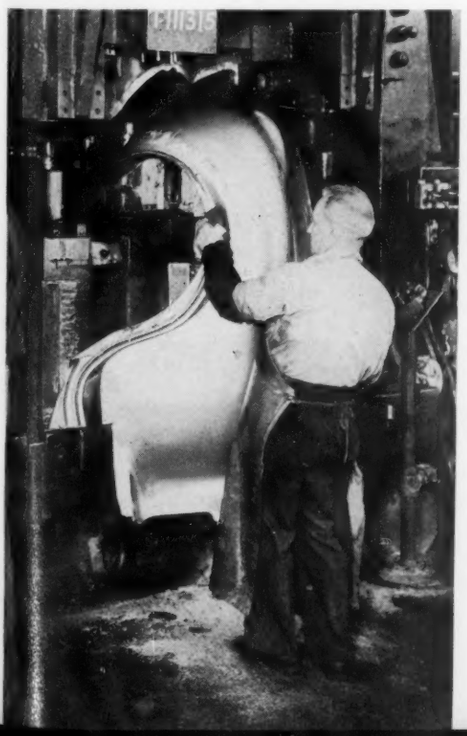
Fig. 5 (Top)—Redrawing headlamp shell. Fig. 6 (Center)—Grill opening is pierced, hood-sill flange and wheelhouse are trimmed and finish trimming is completed in this press. Fig. 7 (Bottom)—Hydraulic piercing press simultaneously perforates all openings

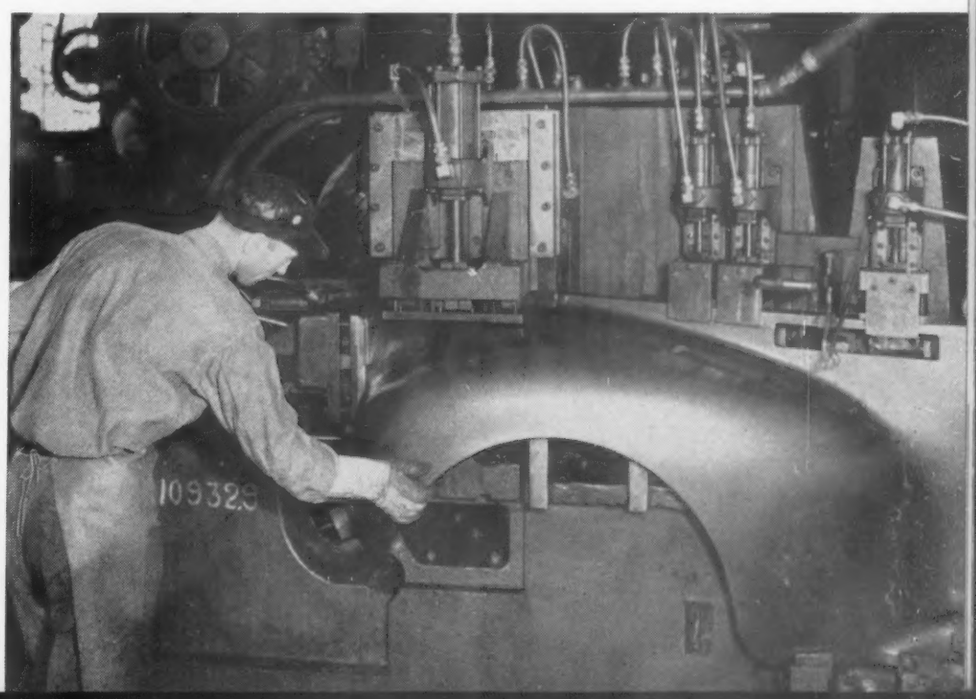
of the rear end and the second rough trims nose. Third station then perforates headlamp section.

Before the fourth station in this press, stamping is removed to an annealing furnace where the headlamp section is heated to relieve any strains from the deep draw. It then goes to a small press, Fig. 5, for redrawing the annealed headlamp area. Scale meanwhile is removed from this annealed section.

Next step is a three-station press Fig. 6, where the entire unit is finish trimmed and flanged all around. This completes the basic forming

The piece then moves to a hydraulically-operated machine, Fig. 7, which pierces holes for headlamp, headlamp screw hold, parking light, fender iron, hood side to shroud bracket and gravel deflector holes in a single operation. Final step is to reflange outside.





A rubber mat here would be a good investment in safety as bad falls may result from wet floors at drinking fountains

Safety In Small Plants

The "it can't happen here" attitude in some small plants often causes proportionately more accidents than in large plants. Seriousness of the safety problem and recommended procedure here are outlined by an authority

■ THERE is little doubt as to need for safety work in small plants. In fact, some safety authorities state accidents seem more prevalent in small than in large plants, even though the same type of work be done in both places.

Over a period of many years, the author has had the opportunity to study accident control in many plants and has tabulated his studies to embrace a total of 146 different companies in a wide variety of industries and employing from 2 to 100 men per plant. In this group of 146 plants, 35 per cent employ five men or less; 50 per cent employ not over ten men, with only two plants employing more than 75 workmen. Total employes numbered 1313.

In the period from 1933 to 1937, this group had 988 accidents with a total of 4824 days lost—16 man years of time.

These figures are presented merely to show that *accidents do occur* in small plants.

Six of the accidents were on presses, 18 on saws and 52 on machines. Also, there were 172 medical-cost-only machine accidents. Nonmechanical accidents included 58; of these 41 were falls.

Out of 182 nonmechanical accidents which lost time, there were 85 infections that lost 500 days, 193 eye injuries, 1 loose-clothing accident. Awards for loss or loss of use of some member resulted from 48 accidents. Facial disfigurement occurred in six accidents. There was one permanent total disability and one fatal accident. Actual days lost were 1295. Out of 1300 employes, there were 1000 accidents in five years. Thus it is obvious that there are dangers and accident hazards in small plants.

The fact revealed by accident reports continually passing over my desk is that the unguarded saw can and does "bite" in the small plant as quickly as in the large plant. Likewise, ignorance of existing hazards on the part of employes results in injury in any plant regardless of size.

What to do about it? Long years of experience point to the conclusion that accident control is practical even for small concerns with limited working capital.

In any analysis of small plant conditions and accident control, plant organization is important. Most small plants are "one man" companies. The owner or the manager is the entire enterprise from top to bottom, often not only furnishing supervision but himself working in the plant. Transition from a small to a large plant usually takes place when the management has broadened beyond its ability of time and strength to remain full depth in the concern's activities and has found it necessary to turn over responsibilities to helpers. Any accident control system must recognize this condition.

Management's contribution to safety starts with the physical plant. While often the machinery itself may be adequate for production, it may lack safeguards on dangerous parts. Fully one-fourth of the accidents in the above study were attributed to lack of mechanical safe-

Better get a window pole or a tall helpmate, young lady

Abstract from paper presented at Western New York Safety Conference, Buffalo.

By EDWARD C. JACOBS
Assistant District Engineering Manager, American Mutual Liability Insurance Co., Boston

guards. It is not necessary to let an exposed gear or belt go unprotected until funds have been accumulated to provide a standard guard. Something else can be done. A protecting framework can be built with lumber or other available material. The point is, *do* something and do it now to prevent accidental contact.

Of course, accidents vary with the type of work done in a plant. However, the greatest contribution to accidents that processing makes in small plants appears in handling of materials. Highly mechanized processes and high production are usually accompanied by mechanical conveyance of materials. In small plants, movement of material is often accomplished by mere brute strength and awkwardness. Wrong methods in tasks for which employes are unsuited physically thus add to the total injuries in many instances.

This danger can be avoided by pointing out and insisting upon proper methods of moving material. While some education may be involved, proper handling methods are imperative in the small plant as well as in the large one.

Lack of Supervision A Factor

Supervision, or rather lack of it, possibly is the largest single cause of accidents in small plants. In all cases where a good job of accident control has been done, there will be found a leader or group of leaders who has taught the men safety methods and who is responsible for prevention of accidents. In the small plant, direct supervision by a foreman is the exception rather than the rule. In most cases an employe is hired because he represents himself as qualified for a certain kind of work which he is given to handle. He may do that job for weeks on end without any safe-practice supervision whatsoever.

While the owner or manager is in the plant enough of the time to provide general supervision required, the enterprise may suffer for want of an individual with sufficient authority or responsibility to maintain equipment in safe condition and to select, train and supervise employes in safe practices. In this category lies the principal accident difficulty in small plants.

The way out is to select one employe, designate him as the safety supervisor and make him responsible for a safety program in the plant.

While these accident control methods appear quite simple, the question immediately arises, why have they not been enforced before and employed more widely? There are a number of answers.

First, most small plants because they have not had a serious accident are apt to assume the attitude "it can't happen here." In other words they fail to recognize the hazards that actually exist. Thus no means are taken to prevent accidents or to enforce safe conditions with the inevitable results. Thus the small plant insists upon approaching accident prevention problem on its own basis of accidents and so loses the principle which actuates the larger plant which has a multiplicity of accidents from which to gage needs and necessity of safety program. So the small plant often does not tackle the problem with the same energy and efficiency. This is why so many small plants show a relatively higher accident frequency and severity than do better organized plants.

Good Housekeeping Important

There appears little reason for a workman in a small plant being required to search through a pile of miscellaneous steel stock for a section, thus exposing himself to cuts and other dangers as well as wasting time, when in another plant a suitable rack would be provided because safety and efficiency demanded it. Similarly there is no point in permitting objects to lie on the floor in a small plant, when the same floor in a larger plant would be clean and tidy. Good housekeeping with adequate aisle and working space increase efficiency and promote safety in the small plant as well as the large one.

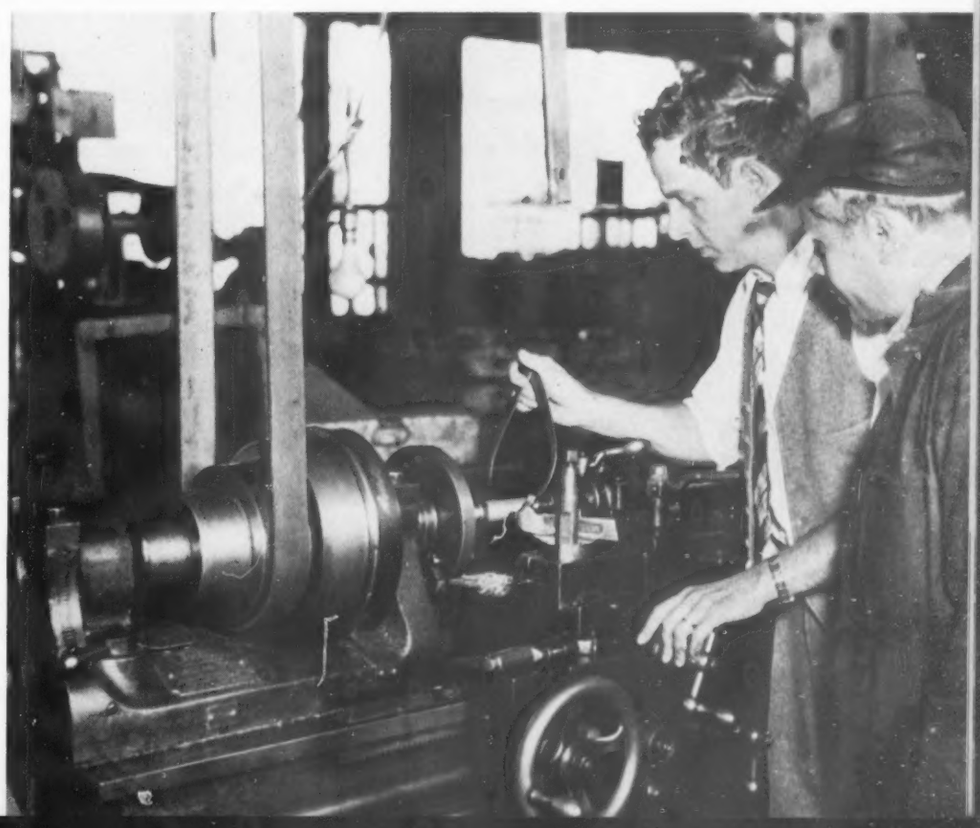
Among causes of accidents in small plants are defective or improperly used hand tools, poor supervision, inadequate lighting, poor flooring, unguarded floor openings, slippery floor conditions, poor housekeeping, faulty maintenance, stairways and platforms without handrails, horseplay, running, improper posture when lifting, inadequate first-aid facilities, lack of physical safeguards and safety training, etc.

Those plants, both small as well as large, which have found the answer to accident control problem know that equipment must be maintained in safe working order and practical safeguards must be provided and used. A knowledge of danger must replace ignorance. Accidents must be followed up with scientific danger control including inspections and supervision.

An adequate safety program for the small plant need not be expensive. A good welder can build substantial welded steel guards for exposed gears and belts at little cost. Employes can be taught known hazards and safeguards set up. Likewise they can be taught the value of proper posture and practices when lifting and handling material.

Appoint some leader or some man definitely responsible in the plant for safe conditions and give him authority to see that safeguards are installed and used properly.

The safety job can be done with means and methods readily at hand in most cases and at practically no expense compared with the cost of accidents it may prevent.



Often the small-plant owner is the whole business, even down to helping out in the work. But safety suffers without foreman supervision

Gas Washing

Recently developed system of wet gas washing by stationary disintegration, when used with parallel spiral-passage moisture eliminator, provides a practical and inexpensive method of completely cleaning blast-furnace gas

By **ARTHUR J. BOYNTON**
H. A. Brassert & Co.
Chicago

■ IN GAS washing by means of water, it first is necessary to wet the particles which are to be removed. In the case of the extremely small particles, this is difficult because any movement of a small body of gas results in a practically corresponding movement of any contained dust particles. This accounts for the inability to do a complete job of cleaning in a rain tower where the drops necessarily displace particles of gas immediately below. The small dust particle follows the movement of the gas, thereby avoiding contact with the water.

To bring the minute particles of dust into contact with the water, various means have been employed. All depend upon a sudden change in the direction of the gas impinging upon a wetted surface and the hope that the minute dust particle may be brought into actual contact with this surface.

Spiral Parallel Passages Preferred

Originally towers were packed indiscriminately and without reference to continuity of gas passage. They were supposed to present a large area of surface and to create turbulence which was thought to be favorable to impingement of dust particles on the filling material. Experience of H. A. Brassert & Co., 310 South Michigan avenue, Chicago, with spiral tile has shown parallel passages each containing a continuous spiral are the preferred means of primary washing. The length of this spiral passage has been found to be a function of the diameter and best results are obtained if the number of revolutions of the spiral are between four and six. The smaller the diameter of the individual spiral passage the more effective its cleaning power becomes.

It is a fact that where the gas washing tower such as that in Fig. 1 immediately succeeds a primary dust catcher of the ordinary type, the gas may be dirty enough to plug small diameter spiral passages. Consequently, 6-inch diameter passages are used in the lower bank of Brassert washers with a bank of 4-inch diameter passages above the 6-inch and a bank of 3-inch passages above the 4-inch.

An 18-foot diameter tower washer passing 85,000 cubic feet of gas per minute and containing two banks each of 6-inch and 4-inch parallel spiral passages with duplicate spraying, one set of sprays above the two banks of 6-inch passages and one set above the two banks of 4-inch passages, in operation has delivered clean gas with a maximum dirt content of slightly above 0.1 grain per cubic foot. Drop in pressure was approximately 9 inches of water occasioned by the two banks of 6-inch and 4-inch spiral passages having a total depth of 9 feet.

This class of washer, Fig. 1, has its limitations, and further refinement in wet cleaning requires the use of equipment of the rotating disintegrator type or the type known as the Brassert stationary disintegrator, Figs. 2 and 3. The rotating disintegrator is well known and requires no description. The Brassert stationary disintegrator is a new device developed during the past two years. It is based on the principle of producing a concurrent flow of gas and of finely divided water at a high velocity with impingement on a surface at right angles to the direction of concurrent flow.

The velocity of the gas is determined by the pressure consumed in causing the gas to flow through the chamber in which the gas and water are mixed and by the velocity of the water at the point of mixing. The water velocity results from the pressure at which water is sprayed into the gas in the mixing chamber. Present practice for blast furnace gas is to use a water pressure of 150 pounds per square inch and an adjusted gas-pressure loss of 15 inches of water for fine cleaning.

Experience with this device has demonstrated that the reason why gas cannot be fine cleaned by ordinary methods of contact results from low water pressure and slow velocity and the consequently large drops in which the water is introduced into the gas and the low velocity impingement. The stationary disintegrator produces a dispersion of water which is almost entirely mist, which closely contacts the dust particles in the gas and which has a high velocity impingement.

Venturi-Shaped Nozzles Used

The disintegrator unit is shown in Fig. 2. It consists essentially of a venturi-shaped nozzle which carries an integral socket-shaped support for a high pressure nozzle, the latter being arranged to throw a solid stream of finely divided water with an angle of dispersion such that the throat of the venturi tube is completely filled. Gas enters on all sides of the water nozzle and enters the throat in a downward direction. The mixture of gas and water then impinges upon a baffle plate which is provided with a cone, the apex of which corresponds with the long central axis of the venturi tube, and which is provided with two rows of teeth near its periphery, the teeth being staggered to produce an additional impinging effect of water and gas.

The purpose of the central cone is to streamline the flow of the mixture of water and gas, which would otherwise baffle themselves at this point. This system corresponds in considerable degree to the action

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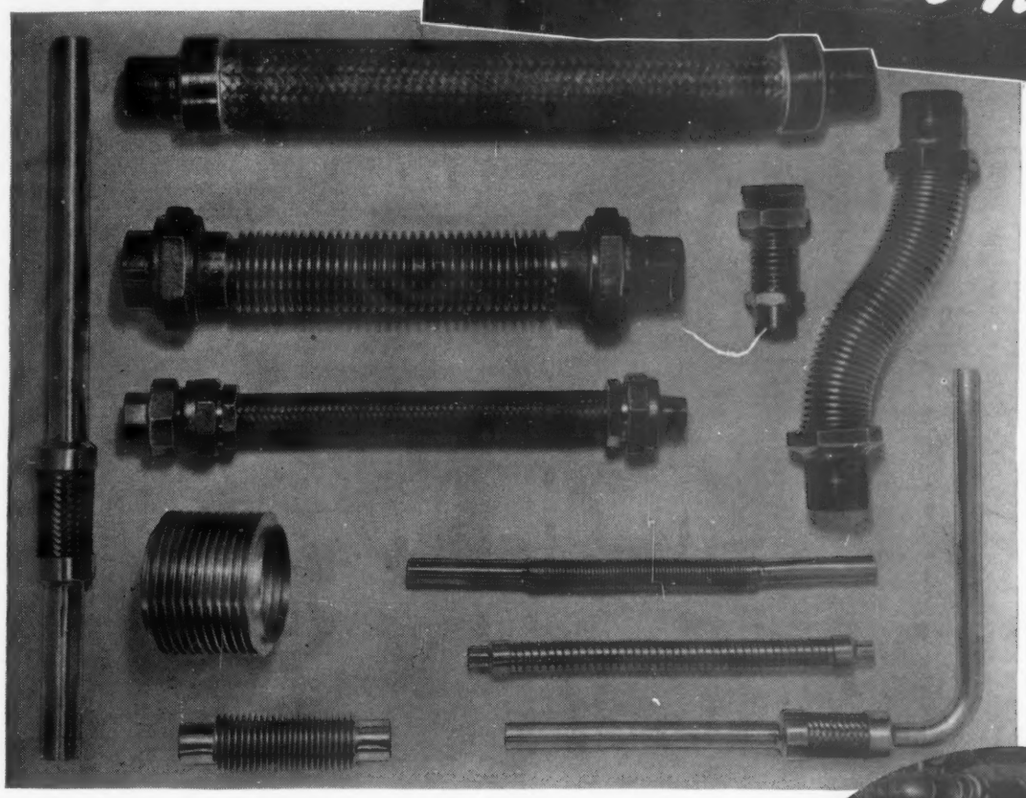

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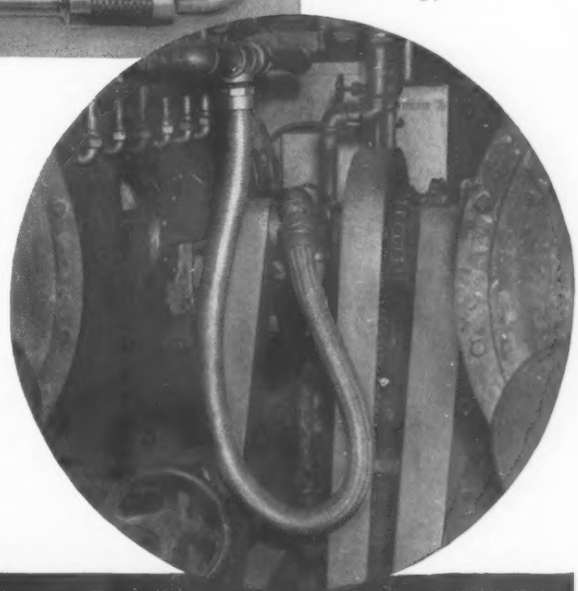

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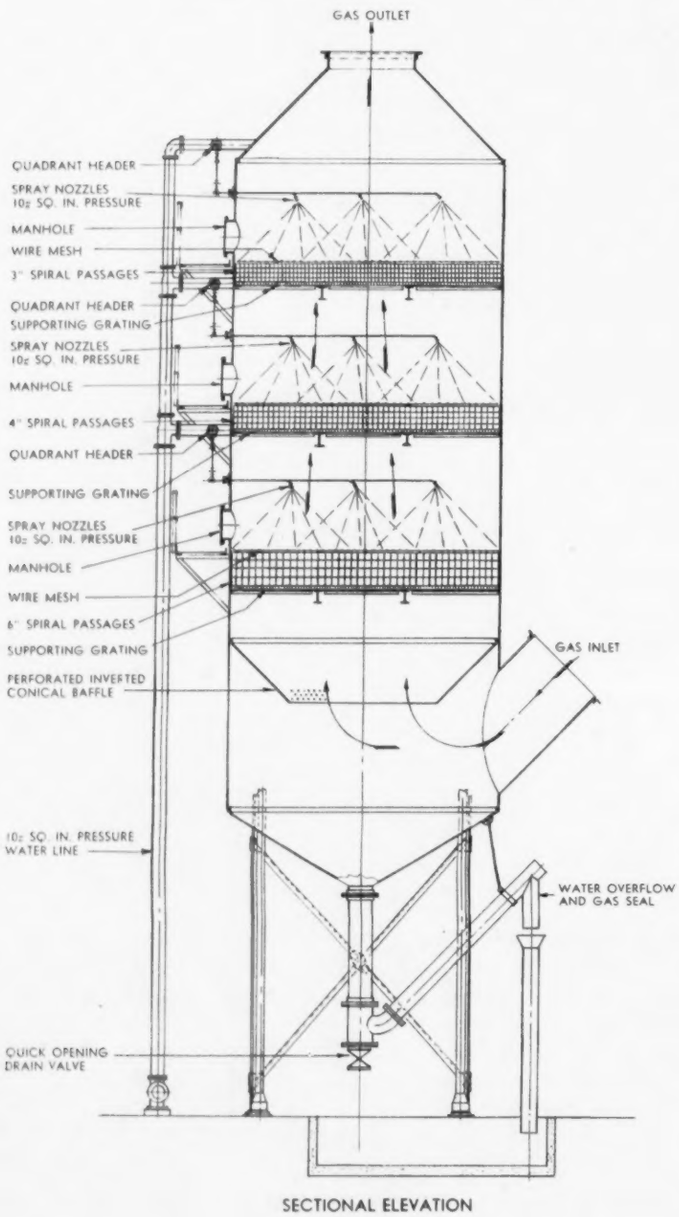
produced by a rotating disintegrator. Gas is mixed with water in a fine state of division, and this degree of mixing is increased by impingements; first on the baffling surface and later on the two rows of staggered teeth. The degree of wetting of the dust in the gas is comparable to that produced by a rotating disintegrator.

The intimacy of contact between dust and water depends on several factors; the first of these is the water pressure. The second is the adjustment of the venturi tube with relation to the baffle plate. The closer the distance between the venturi tube and baffle plate the more effective the device becomes in its wetting and cleaning power due to increased velocity impingement. However, this increased efficiency of cleaning is accompanied by an increase in back pressure. The device has been operated to date at back pressures varying between 8 inches and 17 inches of water. All of this back pressure is due to the baffle plate. In the absence of the plate there would be a slight rise in pressure due to the aspirating effect of the water.

In order to make the stationary disintegrator practical, several conditions must be fulfilled. The first of these is the condition of capacity per nozzle. The original development was made with a venturi tube having a throat diameter of 3 inches. This was found to be adequate for 400 cubic feet of gas per minute. After the technical development of this device had been completed we decided that it would be desirable to use a considerably larger unit as a means of reducing the number of units required, and the complications of piping as well as increasing the size of the water nozzle used for high pressure water. Therefore, a new disintegrator was developed having a throat diameter in the venturi tube of 4¾ inches which in actual test has rated 1000 cubic feet of gas per minute, which rating may be somewhat exceeded. The standard rating is one disintegrator unit per 1000 feet of gas per minute.

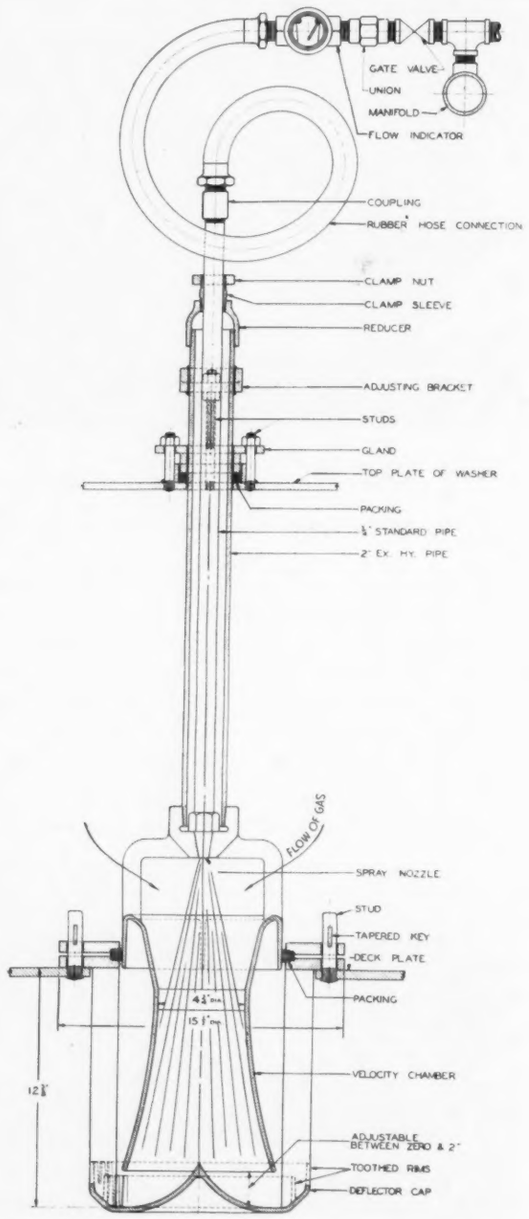
The second condition which had to be fulfilled was that adjustment of the position of the baffle plate relative to the venturi tube should be possible from outside the tower, otherwise an unnecessarily high back pressure might be carried for

Fig. 1—Gas washing tower of the plain parallel spiral-passage type with three banks of sprays, used as a preliminary washer



SECTIONAL ELEVATION

Fig. 2—Section through stationary disintegrator unit employed in the newly developed cleaning system



a long period until it became convenient to enter the tower to make a readjustment. On the contrary, a change from one grade of pig iron to the other might make it desirable to decrease the clearance between the venturi nozzle and baffle plate for the sake of more effective cleaning with higher silicon iron.

The means whereby this adjustment is practically effected is shown in Fig. 2. The disintegrator units are located in a horizontal deck or diaphragm within the tower. The baffle plate is supported by an angular circular casting having three supporting legs for the baffle itself. The venturi tube is supported by a length of 2-inch extra strong pipe which protrudes from the horizontal flat top of the tower. Means of holding this pipe at any given height is provided. Adjustment may be made by a mechanic with a wrench without entering the tower or causing any leakage of gas.

A third requirement is the ability to examine the high-pressure water nozzle, and if necessary to clean it from outside the tower. This is provided for as shown in Fig. 2. The ¾-inch pipe which carries the nozzle is fastened into the yoke sleeve so that, upon seating the nozzle into the yoke of the venturi casting, the clamping nut, after tightening, prevents any movement of the pipe or nozzle.

The results of this construction are as follows: The degree of cleanness of the gas may be varied. The consumed gas pressure through the stationary disintegrator may be varied. The high-pressure water nozzle may be changed or cleaned without interruption to the operation. The surface of the tower is free from gas leaks and no difficulty is encountered in making any of the above adjustments.

Flow Indicator Provided

To permit the flow through the high-pressure nozzle to be checked instantly without disconnecting any pipes, a sight flow indicator of standard make has been provided as shown in Fig. 2 so that any nozzle becoming clogged is immediately apparent upon inspection.

The above construction is designed for operation with the gas going through the stationary disintegrator nozzle in a vertical direction from above downward. The disintegrator nozzle itself will work equally well in any position.

Depending on a particular application of the Brassert stationary disintegrator, the volume, pressure and velocity of the liquid and the velocity and pressure loss of the gas are set to secure the maximum amount of contact with a minimum of operating power.

Some of the advantages obtained with this device are listed as follows: Degree of cleanliness of the gas or air after washing in this device can be varied accurately. The back pressure and velocity of the gas or vapor passing through the disintegrator may be closely controlled.

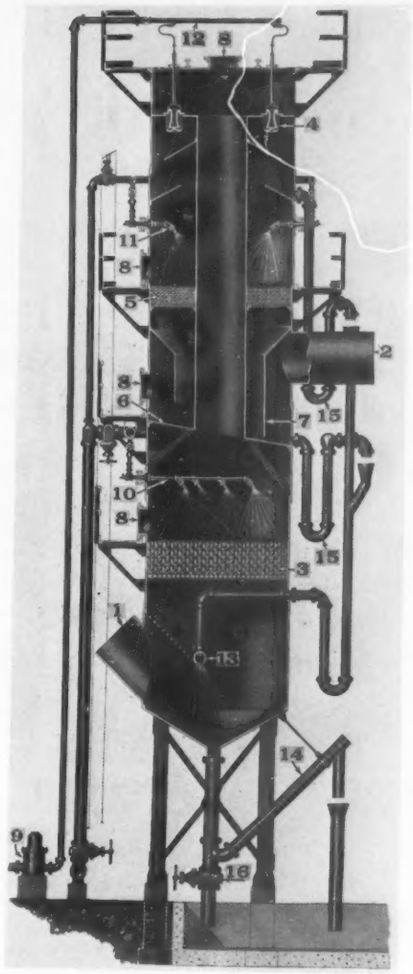


Fig. 3—Latest type combination cleaner. Here parts are 1—gas inlet, 2—gas outlet, 3—preliminary washer, 4—stationary disintegrator, 5—moisture eliminator, 6—sloping deck, 7—baffle plate, 8—manhole, 9—strainer, 10—washing sprays, 11—intermittent flushing sprays, 12—high pressure header at 150 pounds per square inch, 13—perforated spray pipe, 14—seal and overflow, 15—water level, 16-drain valve

The high pressure nozzle for water or other liquids in each unit may be changed or cleaned without interrupting the main operation. The construction is such that there can be no difficulty encountered in making any of the above specified changes or adjustments.

By multiple-grouping of units, large capacities can be obtained in a minimum of space with a parallel or series flow. Once adjusted for a given performance it requires little attention, but can be quickly readjusted when conditions change in the liquids and gases being handled.

Each unit acts as its own shut-off valve when adjusted to a closed position, thus providing further flexibility in capacity of a multiple-grouped parallel or series unit. Each unit is large enough to permit construction of durable materials and to avoid the likelihood of clogging and may be made of material that can be cast.

Contacting Ability Nearly Perfect

Its contacting ability when adjusted for specific conditions is nearly perfect for the exchange of heat between gases, vapors and liquids.

The results to be expected from the washer described above are:

Temperature of outlet gas, 5 degrees Fahr. above inlet water temperature; solid material remaining in gas, 0.015 grains per cubic foot; particle size analysis of solid materials is 82 per cent below 1/2500 of an inch, or 2 microns; pressure drop through 6-inch spiral passage is 3.5 inches W. G.; pressure drop through 3-inch spiral passage is 3.0 inches W. G.; pressure drop through stationary disintegrator is 15.0 inches W. G. Pressure drop through eliminator is 3.0 inches W. G., and the total is 24.5 inches W. G.

The horsepower requirement for high pressure water for a 1000-ton blast furnace is 156, or 1.7 horsepower per 1000 cubic feet of gas per minute. This figure compares with that usually stated for the rotary mechanical disintegrator or other form of final washer.

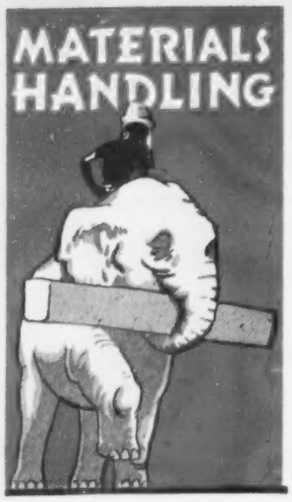
Horsepower required for pumping low pressure water is estimated at 57. This expenditure of power is incurred in any primary washing system.

The additional load on the blowing engines due to the back pressures itemized above is estimated at 190 horsepower. The total horsepower allocated to gas washing is, accordingly, 403 or 4.5 horsepower per 1000 cubic feet of gas per minute.

The stationary disintegrator in combination with the parallel spiral-passage primary washer and the parallel spiral-passage moisture eliminator, all contained in the tower shown in Fig. 3, appears to be a practical and inexpensive means for complete cleaning of blast furnace gas.

Hardness Correction

■ All references to Rockwell hardness appearing in the article, "Strip Welding Practice," STEEL, Nov. 13, p. 46, should have been to the Rockwell B scale instead of the Rockwell C scale. This error appeared on the author's original manuscript, we are advised.



"Flash Baking" Oven

. . . increases production and improves quality of varnish coating on steel sheet for making electric motor laminations. Stainless steel stranded wire conveyor synchronized with varnish applicator and slitter cut time to two minutes

By K. H. MEYER
Methods Engineer
Reliance Electric & Engineering Co., Cleveland

■ DOUBLED production and improved quality of baked varnish coatings on steel sheets for electric motor laminations have followed the installation of a synchronized sheet slitter, varnish applicator and conveyorized flash-baking oven at Reliance Electric & Engineering Co., 1088 Ivanhoe road, Cleveland. Sheet moves progressively through slitting, varnish coating, baking and cooling operations at upwards of 25 feet per minute and completes the series in about two minutes.

Before this installation the steel sheet was cut into squares by power shears, fed manually into varnish applicator rolls and dropped onto a wire screen belt moving slowly through a bake oven. At exit end, the squares fell into a receptacle and had to be rearranged before going to the blanking presses. This involved moving the material by bulk twice and piece-by-piece three times.

The new equipment eliminates all but one piece-by-piece handling in feeding the slitter and one bulk movement in transferring the baked strips to the blanking presses. The straightline flow of the sheets from slitter to exit end of oven is shown in Fig. 1.

Sheets, from 22 or 29 gage, up to 40 inches wide and about 10 feet long, are unloaded in a pile at the slitter, A, Fig. 1, and fed manually into the slitter as shown in Fig. 2. The slitter is equipped to cut the sheet into as many as seven strips in a single pass. After slitting, the strips go forward on a gravity roller conveyor to varnish applicator rolls, B, Fig. 1, synchronized with slitter by being driven from the same gearmotor. There are three rolls arranged vertically one above the other. The top two are felt covered, soaked with varnish and exert sufficient pressure against each other to apply a uniform coating of varnish to both sides of the strips. Varnish is fed to the top rolls by the bottom roll of bare steel which is half submerged in varnish kept automatically at a constant level.

Leaving the rolls, the strips fall on a specially designed oven conveyor, C, Fig. 1, consisting of parallel, finely stranded stainless steel wires passing over grooved steel drums at each end of the oven. A gearmotor drives conveyor through drum at exit end of oven. Wires were used for the conveying medium to minimize heat carried out of oven. To obtain a level loading and conveying surface, each wire is held at a uniform tension by an individual spring-actuated counterweight riding the return stretch beneath the oven. After the varnish had once formed a coating on the wires it was found there were no further varnish accumulations and that wires needed no cleaning.

Varnish Set on Fire

Entering oven, the wet varnish coating on the strips is set on fire by the flames of four rows of low-pressure jets, two above and two below the entering strip. These are shown at D just inside oven entrance in Fig. 1. It is from this operation that "flash-baking" derives its name. The varnish on the sheet is deliberately set on fire on both sides to remove quickly the volatile thinner from the varnish. This is in effect a curing process to speed up baking that immediately follows.

Temperature of the baking chamber is maintained at 750 de-

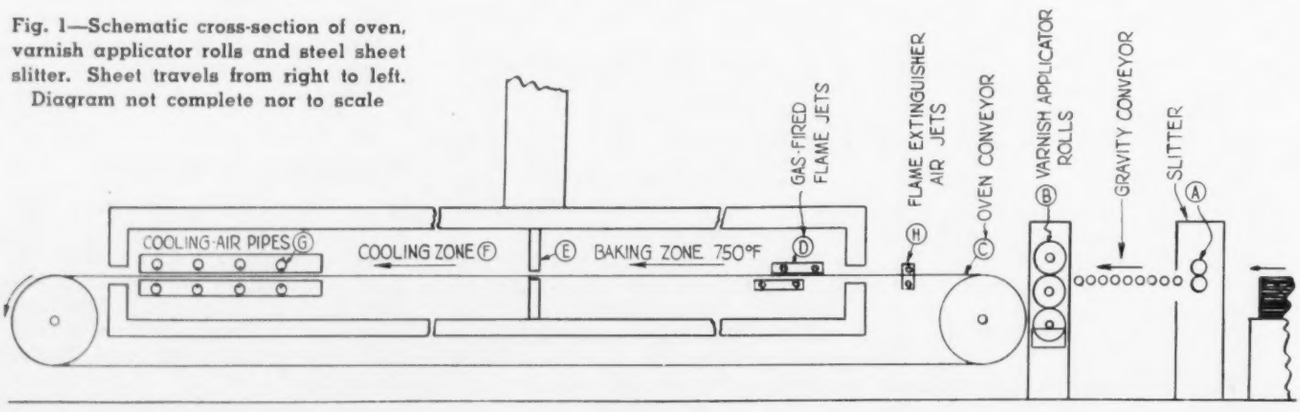


Fig. 1—Schematic cross-section of oven, varnish applicator rolls and steel sheet slitter. Sheet travels from right to left. Diagram not complete nor to scale

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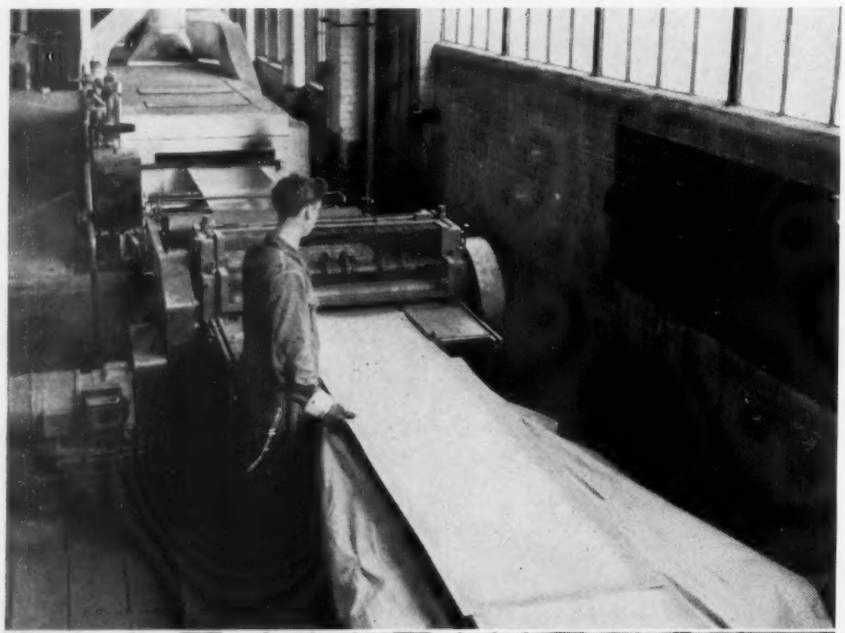
grees Fahr. Heat is obtained from the burning of the volatiles in the varnish, from air at 200 degrees Fahr. returned from cooling chamber and from thermostatically controlled, low-pressure gas burners. An induced-draft fan removes fumes of burning volatiles from oven through ducts placed above and below sheets near separating wall E of Fig. 1.

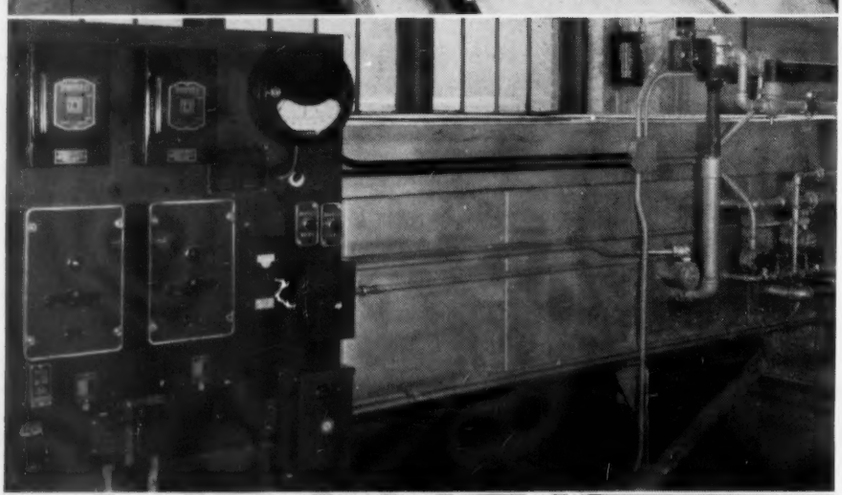
Part of the air to sustain combustion of the volatiles is piped from the cooling chamber and forcibly blown on both sides of the sheets in the direction of conveyor travel. This aids in preventing backflashing which might otherwise occur in firing sheets approaching maximum width of the oven. As an added precaution to keep back-traveling flames from reaching the varnish tank of the coating rolls, the length of conveyor between oven and tank has been made a little longer than the longest sheet to be handled.

Moving through a narrow open-

(*Please turn to Page* 84)

Fig. 2—(Top)—Steel sheets are taken directly from stock pile and fed into a slitter. Top varnish roll seen above slitter. Fig. 3 (Center)—Oven controls are centralized on this panel and are interlocked so that failure of air, gas, electric power or ventilation immediately halts oven operations. Fig. 4 (Bottom)—Discharge end of oven showing stranded wire conveyor and air ducts





Accredited Curricula for More Engineering Schools

■ As part of its objective to enhance the status of the engineering profession, the Engineers' Council for Professional Development, 29 West Thirty-ninth street, New York, a joint co-operative body of seven major engineering organizations, has issued its 1939 list of accredited undergraduate engineering curricula leading to degrees in United States colleges and universities. This list contains 525 curricula in 118 schools.

Engineering schools added to the list during the past year include: Alabama Polytechnic, Auburn, Ala.; Northeastern university, Boston; Pratt institute, Brooklyn, N. Y.; Southern Methodist university, Dallas, Tex.; Vanderbilt university, Nashville, Tenn.; and United States Coast Guard academy, New London, Conn.

Since inauguration of the accrediting program in 1935, the council's committee on engineering schools, of which Dr. Karl T. Compton, president, Massachusetts Institute of Technology, Cambridge, Mass., is chairman, has appraised the various curricula in each school separately, considering such factors as qualifications of faculty, standards of instruction, scholastic work of students, records of graduates, attitudes of the administration, as well as physical facilities, finances, requirements, and size of staff and student body.

Dictionary Covers Technical Language

■ *Standard Chemical and Technical Dictionary,* by H. Bennet; 638 pages, cloth, 6½ x 9¼; published by the Chemical Publishing Co. Inc., New York; supplied by STEEL, Cleveland, for $10.

This is a condensed technical dictionary for students, writers, technicians, engineers, scientists and others needing assistance in keeping up with new chemical, physical, mathematical, engineering and technical words. The 25,000 definitions cover industrial products, chemicals and trade names, abbreviations and contractions, as well as symbols used in mathematics, chemistry, thermodynamics, pharmacy, etc.

Contents include: Introduction to use of the dictionary, nomenclature of organic compounds, prefix names of organic radicals, abbreviations and contractions, dictionary covering chemistry, physics, biology, mathematics, engineering and technology, together with a section devoted to Greek, mathematical, apothecary and miscellaneous symbols.

Automatic Chassis Welding

Chassis siderails are welded automatically at a maximum rate of 257 per hour in highly engineered setup. Welding guns, air actuated, float vertically to permit accurate self-positioning of welding tips on curved surface of work

By C. E. HEITMAN
Chief Electrical Engineer
Edward G. Budd Mfg. Co.
Philadelphia

■ CHIEF drawback of the widely used I-beam section in automobile chassis construction is its weight. A leading automobile manufacturer uses box sections to lighten the chassis, without loss of strength or rigidity. These sections are fabricated on a production basis by specially-designed automatic welding equipment described here.

In this chassis, the box sections consist of a flanged U-channel to which a flat plate is spot welded to form the closed sectior.. This unit, see cross section in Fig. 1, is used in all siderails and cross members of this chassis. Siderail production will be described here. Both right and lefthand rails are contoured the same along the C-D axis and opposite along the A-B axis. Fig. 2 shows a siderail just after it has been removed from one of the welding machines.

Assembly of these rails requires two operations: First is gaging the cover plate with respect to the channel, and second is spot welding the two parts together.

On the 1938 model chassis, the channel section was formed of metal 0.093-inch thick with a cover plate 0.062-inch thick. Channel and cover plate were assembled in a hydraulic jig to obtain proper alignment. Then twelve spot welds were made along each flange. After being moved from the jib, the section was placed on a conveyor and the necessary additional welds put in with portable hand-operated welding guns. Welds in the finished section were spaced about 1¾ inches apart.

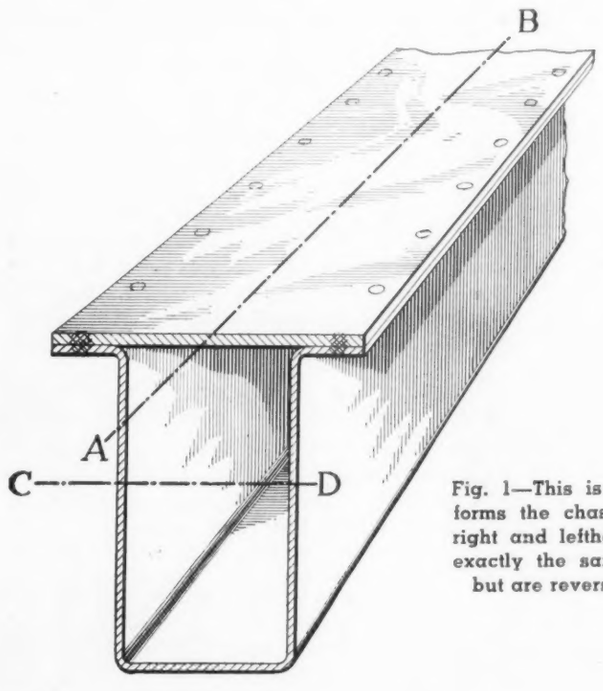


Fig. 1—This is the box section which forms the chassis side member. Both right and lefthand rails are contoured exactly the same along the C-D axis but are reversed along the A-B axis

Specifications for 1939 models called for certain cover plates to be increased from 0.062 to 0.125-inch in the chassis. Tests showed this thicker cover plate could not be welded to the 0.093-inch channel in the same equipment, so the first problem encountered by Edward G. Budd Mfg. Co.'s engineering department 25th and Hunting Park avenue, Philadelphia was to design new equipment to handle the heavier model properly. Also, the equipment must handle the light cover plate as well since some retained this thickness.

The chassis for 1940, now in production is from a welding standpoint similar to the 1939 design, and the procedure described here, having been satisfactory for the 1939 model, is being used for the current chassis.

Perfect Welds Required

First requirement was to produce perfect welds from a structural standpoint. Exact location and spacing of welds also was important because of subsequent operations in fabricating the complete automobile. Another essential was high production. Since 200 frames per hour were necessary, peak production of 240 per hour therefore had to be obtained to allow for outage time.

To determine accurately the exact conditions required to get perfect spot welds in the heavier material, a number of tests were made. These showed that welding current of 28,000 amperes flowing for 20 cycles was necessary combined with an electrode pressure of 1800 pounds using ⅝-inch diameter electrodes. For the lighter plates, only 20,000 amperes for 15 cycles was required

with an electrode pressure of 1000 pounds using the same ⅝-inch diameter electrodes.

Preliminary tests to see if portable welding guns would handle the job proved unsatisfactory as welds could not be spaced accurately enough to meet the requirements. Roller welding, investigations showed, produced a job up to specifications but was too costly in this instance because of the high production rates required.

Single Machine Impractical

Hydromatic welding next was considered and finally adopted after a number of modifications were made. With this method, a separate welding gun is provided for each spot location on the bar. This means 232 welding guns for each of the two bars. Since welds are spaced 1⅜ inches apart, maximum permissible width of gun would be less than 1⅜ inches if all were mounted in one machine. This would limit pressure cylinder diameter to ⅞-inch, and to obtain the necessary total pressure of 1800 pounds welding pressure, unit pressure of 2000 pounds per square inch would have been required.

This was impractical and spacing the guns so close together would make them inaccessible so it was decided to employ several welding machines instead of one. Thus each machine makes only part of the total number of welds. This permits spacing the guns as far apart as may be desired, permits larger cylinders and correspondingly lower unit oil pressures as well as complete accessibility.

Employing four machines allowed a spacing of 4⅛ inches between center lines of adjacent welding guns, permitting a 2¾-inch diameter cylinder to be used with ample clearance. See cross section in Fig. 3.

Up to this point, the use of high-pressure oil for the operating medium had been considered. However, previous experience showed welds produced with it had the characteristic appearance of insufficient electrode pressure, although tests proved conclusively that the required pressure was available between the electrode tips under static conditions.

During fusion time, however, static conditions do not exist as a certain amount of indentation appears necessary on at least one surface of the piece. This means electrode tips are closer together after the weld is completed, implying motion during the time the weld is made.

Inertia in electrode tip and supports necessitates a definite time required for force acting on the tip to move it through the required distance. No matter what prime mover is employed, a certain amount of inertia also is involved in it. Since the oil itself is comparatively non-compressible, the oil in the tube between prime mover and operating cylinder also adds something to the inertia value.

Inertia Reduces Weld Pressure

There is a momentary drop in oil pressure before the oil and prime mover can overcome their inertia and allow oil to flow to the operating cylinder. The combined effect of these inertias is that there is a period of time during which the effective pressure at the weld is drastically reduced.

While this time probably is very short, it may be long enough to prevent proper forging of the weld. Also, it greatly increases the amount of heat generated at the electrode contact. Result is an unsound weld with unsatisfactory surface appearance.

To provide a system with sufficient motion or "follow-up" during the actual welding period to produce sound welds of good surface appearance, it appeared necessary to design the welding gun so members which support the electrodes would have enough deflection under normal pressure to act as a spring between operating cylinder and electrodes. The same effect also could be produced by employing a coil spring between the operating cylinder and electrodes. Likewise, by using an excessive normal pressure improvement could be made.

Another possible solution was to use a highly compressible pressure medium such as air. This would result in better follow-up due to the lower pressure drop than with a hydraulic system.

First two methods were not conveniently adaptable to this particu-

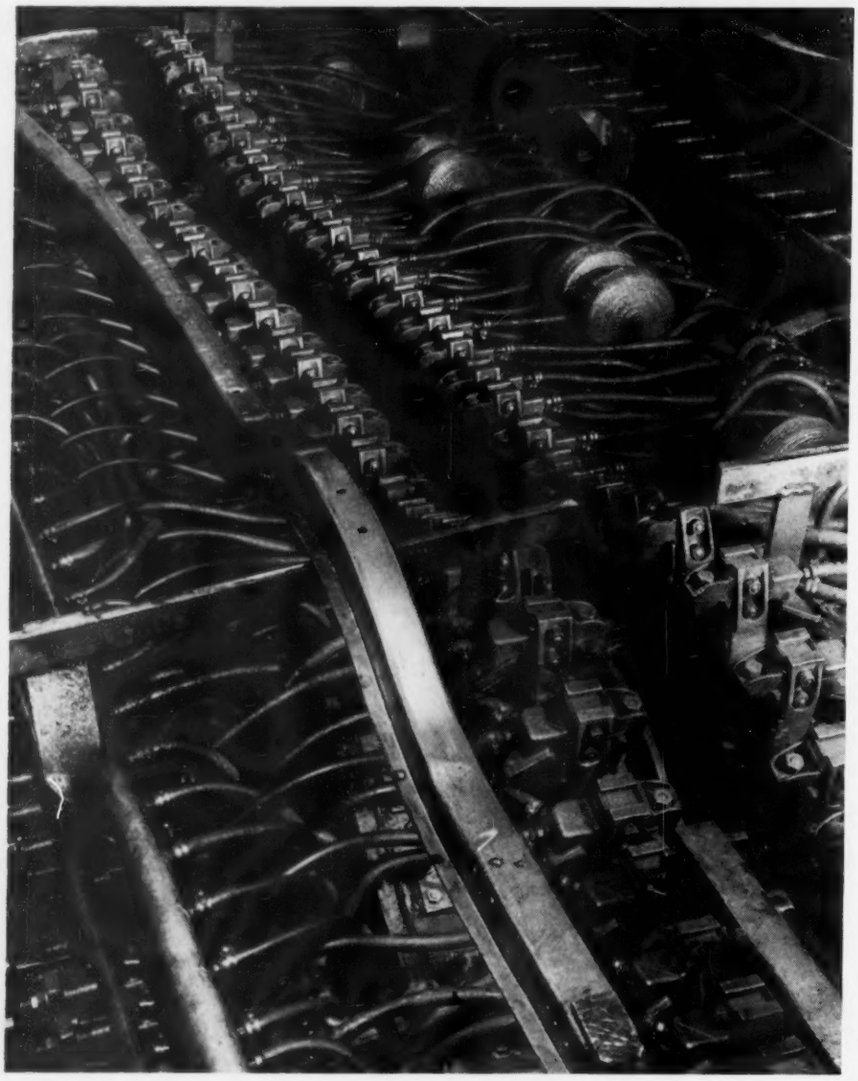


Fig. 2—Here a box section side member has just been removed from the line of welding guns which may be seen at the right. The rail goes successively into four machines, each making a portion of the total welds required Illustrations courtesy Edward G. Budd Mfg. Co., Philadelphia

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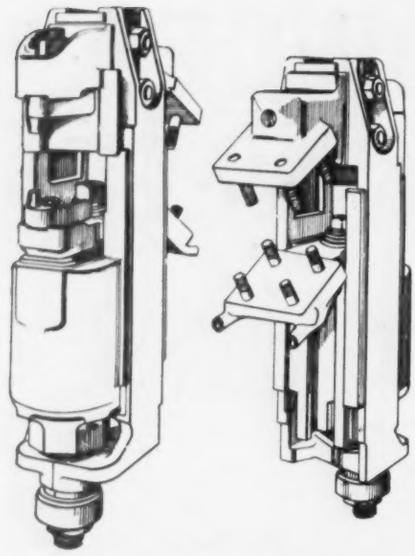


Fig. 3—Front and rear views of hydromatic, double cylinder welding gun used here

lar machine and third method was considered not sufficiently effective. The fourth was judged most satisfactory and also was readily adaptable.

The 2¾-inch diameter cylinder meant employing an air pressure of 350 pounds per square inch, allowing for frictional losses in the welding gun. General design of the gun is shown in Fig. 3. A double-acting cylinder eliminated some trouble experienced when springs were used to return the electrodes to open position. Upper and lower electrode supports are completely insulated.

Gun Floats Freely

Entire gun is free to float up and down in a slide so either tip is free to move to align itself vertically with the part being welded. In normal operation, gun cylinder rests on top of the stationary part of the slide. When air is admitted, upper side of piston, moves down carrying the upper electrode with it. This motion continues until electrodes strikes the metal to be welded when further piston movement causes the cylinder to move upward in its slide carrying the lower electrode with it. Normal opening between tips is about 1 inch. This scheme permits the part being welded to be fixed rigidly at any point within this opening and yet assures perfect seating of both electrodes.

Exposed parts of the gun are stainless steel or bronze, Mallory No. 3 being used for electrodes and electrode holders which are water-cooled internally and connected to the transformer by short flexible connectors.

With four machines for each chassis sidebar, a total of eight is required to complete operation on right and lefthand bars. First machine on each line of four serves as a welding jig in which the cover plate is located accurately in respect to the channel. This jig maintains assembled sidebar in correct shape during initial welding at 23 spots on each flange distributed throughout its entire length. These fix position of cover plate and channel while bar is passed through remaining machines and constitutes 46 of the required 232 welds per bar. The remaining three machines weld 64, 62 and 60 spots respectively.

On each machine the required number of guns is installed, half on each flange of the bar. Gun support brackets on which the gun is free to move up and down are mounted rigidly on the frames of the machines to fit sidebar.

Total Cycle Time 15 Seconds

To obtain the entire production of 240 bars per hour, it is necessary that the operation cycle of loading, welding and unloading be no longer than 15 seconds. With 8 seconds allowed for loading, closing and opening the machine and unloading, just 7 seconds are available for the actual welding operation.

From previous experience it was decided to set 1 second as the maximum overall time per weld. In terms of 60-cycle alternating current, this is divided into 10 cycles for pressure build-up period, 20 cycles for current application, 15 cycles to hold pressure and 15 cycles off time, totaling 60 cycles, or 1 second.

With 7 seconds available for welding and 1 second being required for each weld, it follows that there is time for only seven successive welding periods per bar in any one of the four machines. To weld at 64 locations in the No. 2 machine during this time, it is necessary to weld at ten locations simultaneously for five successive periods, then weld at eight locations simultaneously for the next period and at six locations simultaneously for the final period.

Since it is impractical to weld satisfactorily at more than one location at a time with the same welding transformer, ten separate welding transformers are provided in order to weld at the ten locations simultaneously. Thus each of the No. 2, 3 and 4 machines is divided into ten welding zones, five on each side, with a welding transformer for each zone. No. 1 machine is divided into eight welding zones, four on a side, because of the fewer number of welds made on this machine.

Air Valves Actuate Guns

Welding guns are actuated by cam-operated 4-way air valves, each valve actuating two guns. The No. 2, 3 and 4 stations have 32, 31 and 30 valves respectively, mounted on one side of the machine and operated from a camshaft driven by a Geneva stop motion. The cams are arranged so one valve in each of the five zones is operated simultaneously, ten guns at a time.

A Geneva stop motion, a 4-point star wheel engaging a pinwheel, rotates the camshaft so air valve opening, pressure build-up, current applicaton and forge or hold time are controlled properly.

Current-application time of 20 cycles is controlled by a timer which is set for operation at the point in the cycle which produces optimum "pressure build-up" and "forging" periods.

Upon completion of first weld in each zone, rotation of the Geneva pinwheel causes the next cam to operate the next valve, the preceding cam moving at the same time

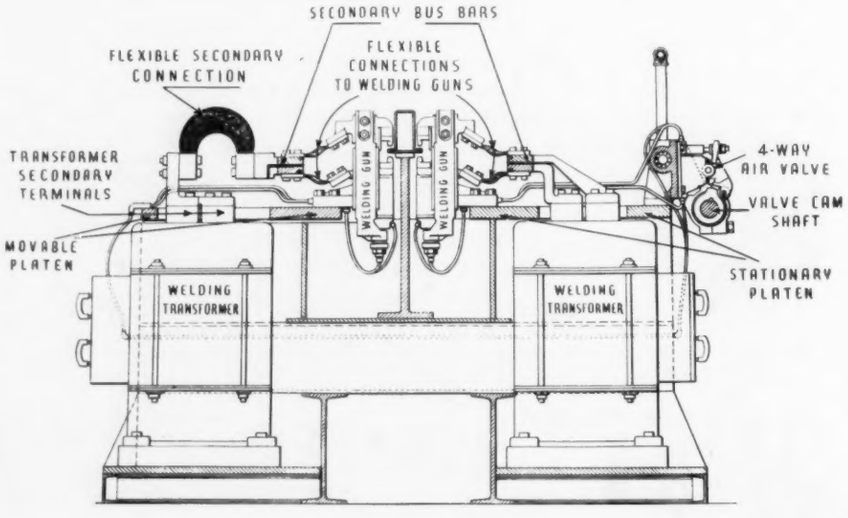
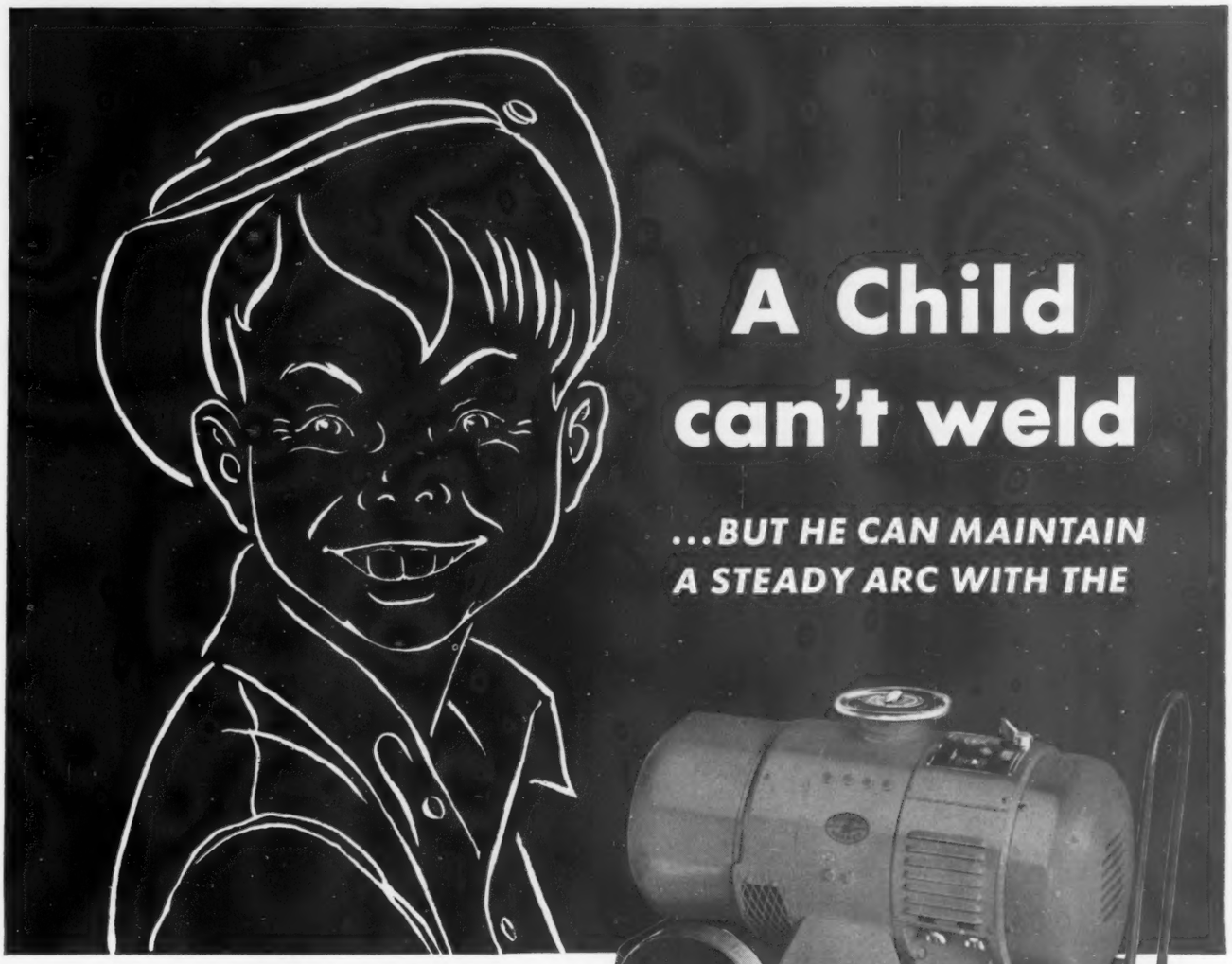


Fig. 4—Cross section through hydromatic welding machine. At top center between welding guns is the chassis member. Four machines of this type are used, each making a portion of the welds. This allows proper spacing between guns in each machine



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to release the first valve. Thus pressure is applied to the next gun in each zone and the weld is completed as described above.

In the normal position, each valve supplies air pressure to the lower side of the piston holding the electrode tips in the open position.

The above action is repeated for each of the seven operations required to complete the weld in all locations on this machine. When completed, another motion of the Geneva star wheel operates a pilot valve which releases the movable side of the machine, permitting removal of the side bar.

While the machine is being loaded, a cam operates a limit switch to stop the driving motor. When loaded, operator closes an air valve to close the machine to the welding position, automatically starting the welding cycle. Maximum sustained production possible with this machine is 257 bars per hour.

Welding guns on one side of the machine are mounted on a stationary platen, guns on opposite side on a movable platen. Welding transformers for the latter side are placed directly under this platen with secondary terminals extending through cutouts in the platen. On the stationary side, secondary busbars are bolted directly to transformer terminal pads which constitute the only support for the busbars.

On the movable side, busbars on insulating supports move in and out with the table. Electrical connection between busbar and transformer is made with 24 strands of copper braid, each 3 inches wide and 1 inch thick, providing a total area of approximately 4,000,000 circular mills. Smaller flexible jumpers consisting of five strands of 3 x ⅛-inch copper braid with an area of 835,000 circular mils provide connection between busbars and upper and lower electrode holders of each gun.

This design gives minimum reactance and affords constant busbar impedance for all parts along the bus at which gun jumpers are connected. This is important as it delivers the same welding current to all guns irrespective of location.

Cross-section area of the bus is comparatively low. Skin effect prevents uniform distribution of current through the bar so heavier ones would have little effect on bar resistance. While an increase in bar width would reduce effective resistance and reactance, space requirements prevent this. Because of the small area and high current density, water cooling is provided to prevent overheating. While it is impractical to water cool the flexible jumpers, cooling of the surfaces to which they are bolted serves to dissipate the heat generated in them.

Each of the welding transformers is provided with its own current-regulating switch so independent adjustments may be made without disturbing the others.

A skeleton die placed in the No. 1 machine between the two rows of welding guns guides the channel of the sidebar in relation to a gage pin rigidly attached to the die. Cover plate is attached by hooks to a hydraulically operated ram on which two gage pins serve to hold the cover plate in proper position in relation to the channel.

This ram is divided into three sections—two end sections rigidly mounted and a spring-mounted center section. When ram is moved down with channel and cover plate in place machine, center section strikes first. Continued motion of the ram brings the end sections into contact, producing a wiping action on the cover plate to prevent the metal from buckling in the center. This insures accurate alignment of the pieces at ends.

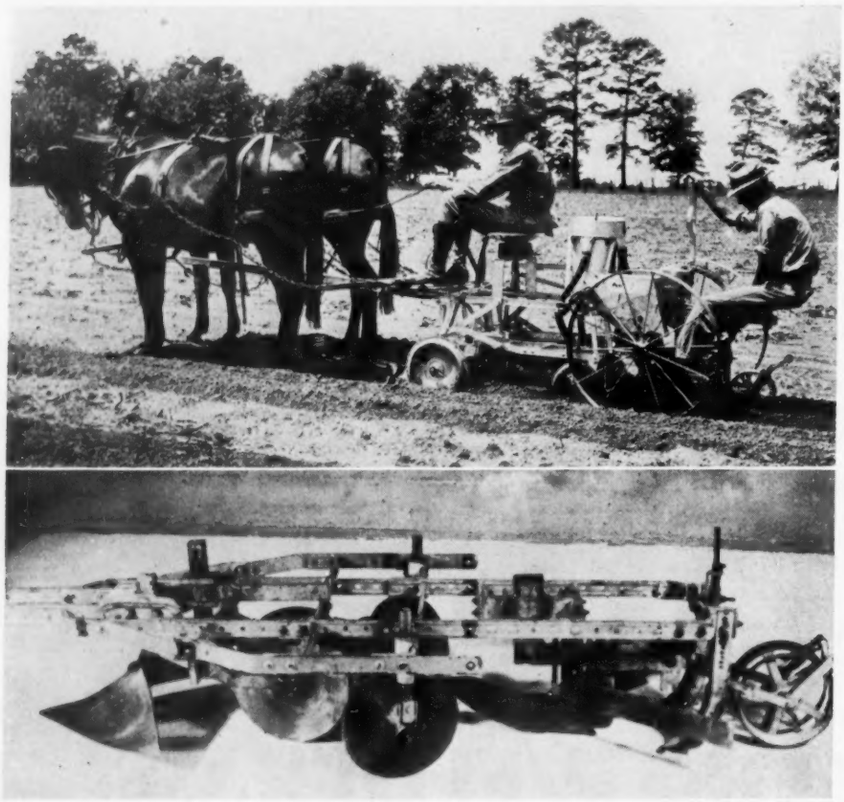
Welding Cycle Is Automatic

After loading, the operator works a hydraulic valve which brings the ram down, aligns cover plate and channel. When the ram hits bottom, it operates a pilot air valve which causes the two tables to move into welding position. One of these strikes a limit switch to start the driving motor of the Geneva stop motion, which in turn controls the valves and welding operation. Thus entire welding cycle is automatic, being set into action by the operator moving the hydraulic valve mentioned above.

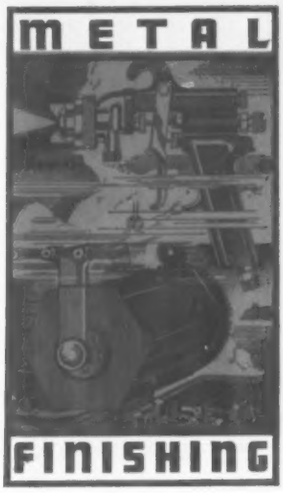
Two operators place the channel section in one side of the machine and two other operators on the opposite side remove it.

The operation of these specially designed welders has been quite successful. Under test, quality of welds has exceeded customers' requirements. Mechanical failure of the production units has been reduced to a minimum and at no time has production or shipping been delayed through failure of the equipment. At the same time a maximum output of 257 bars per hour is obtained.

Welding Simplifies Planter Construction



■ **At top is shown an experimental cotton planter and fertilizer distributor built by Cole Implement Co., Charlotte, N. C. The machine has a subframe, shown below, to which all soil-moving tools are attached. Most of these tools are welded or brazed to standards which in turn are bolted to the subframe. This type of construction keeps the soil-moving tools working in parallel and simplifies the many adjustments necessary in experimental work. Photo courtesy International Acetylene association, 205 East Forty-second street, New York**



Spray Rinsing

Use of high-velocity spray rinsing permits important savings of floor space and water consumption, decreases work and time involved, eliminates carryover between solutions and improves quality of work by more effective rinsing

By J. D. TIERNEY
Storts Welding Co.
Meriden, Conn.

■ DEVELOPMENT of new spray-rinsing equipment for use between various steps when cleaning and electroplating articles affords a number of interesting possibilities in increased economy. Use of this cleaning method provides important savings in floor space, water consumption, operating effort and produces better plating because of a more effective rinsing action.

The method is especially suitable for racked parts. The rinsing operation is performed by alternate vortexes of spray streams circulating clockwise and counterclockwise and interrupted by other straight-line spray streams which produce a multiplicity of eddies moving in many directions.

Provision also is made for turning the work so every portion of the surface is subjected to the impact of the high-velocity atomized rinse water from numerous angles. The combination of vortexes and eddies tends to make the whole inside area of tank a whirling mass of water riding on air currents at atmospheric pressure. Spray is prevented from emerging through open tank top by design of cover and spray streams.

Use of such a system permits a number of economies and greatly increases the flexibility of the entire processing line. In operating these new type rinse tanks, water flows only while the work is in rinsing position, and a spray of great fineness and density at high speed replaces the greater mass of quiet water in conventional still-type rinse tanks.

Saving in Water Consumption

Two advantages claimed for the new process are savings in water consumption of from 38 to 86 per cent and time savings up to 65 per cent. The more energetic rinsing action is said to accomplish cleaner rinsing, which allows use of more effective cleaning agents, now hampered somewhat because of difficulty of removing them completely in the rinse. Also, because only fresh, uncontaminated water makes contact with the work, one spray tank can be made to replace from two to four still-type rinse tanks by cross-aisle arrangement of the plating cycle as shown in accompanying illustrations.

In addition to economies in water cost and better control of rinsing,

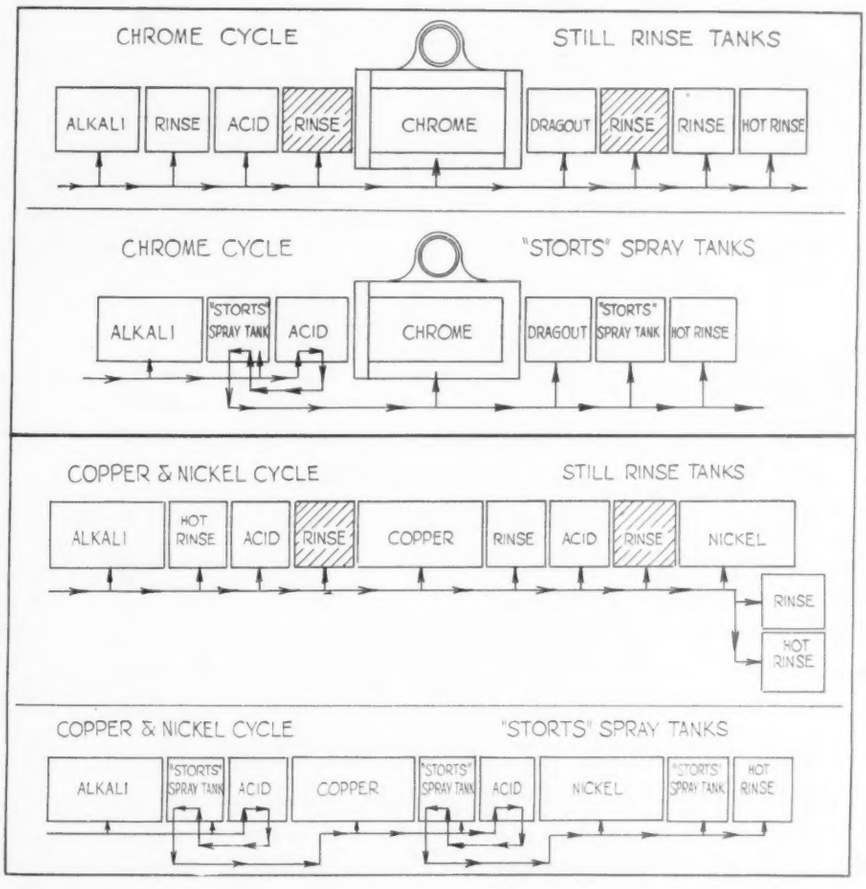
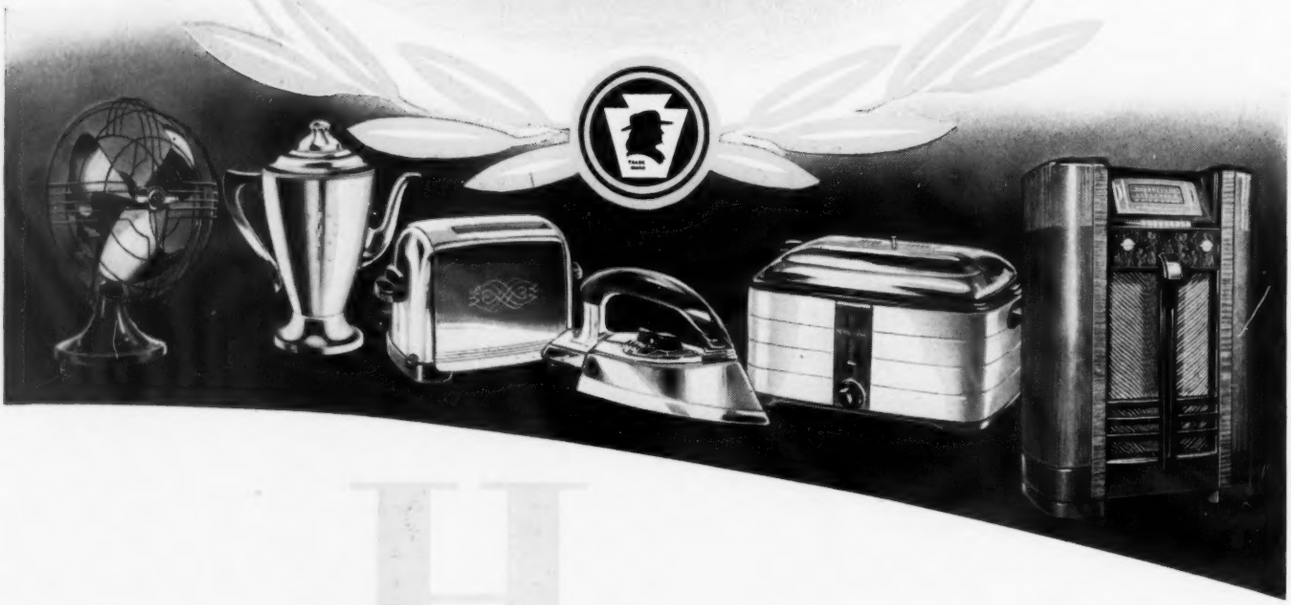


Fig. 1. (Upper)—Here is shown how spray rinsing permits saving in layout of a typical chromium plating line. Fig. 2. (Lower)—These two diagrams show how a typical copper or nickel plating line can be changed over to spray rinsing to advantage

PENNSALT CLEANERS

CUT CLEANING COSTS OF STEEL, BRASS, ZINC, AND ALUMINUM PARTS FOR LEADING APPLIANCE MANUFACTURER



HOUSEHOLD ELECTRICAL APPLIANCES, from refrigerators and washing machines to percolators and curling irons, are produced by this prominent manufacturer and sold throughout the nation. Parts in all of these products are cleaned before finishing operations with the help of Pennsalt Cleaners.

In building home laundry equipment alone, the metal cleaning problems involve such varied operations as cleaning oil or grease, or both, from hot and cold rolled steel, cast iron, aluminum castings, and zinc die castings... prior to such finishing operations as granodizing. The Pennsalt Cleaners used have eliminated several dipping jobs, and have effected appreciable savings in cleaning materials.

Pennsalt Cleaners are also used by this manufacturer to clean steel parts for radio chassis and speaker frames before bright zinc plating; to clean steel and brass parts for percolators, toasters, and similar appliances prior to bright nickel plating; and to prepare the steel of refrigerator cabinets for enameling. 85% of

all the metal parts that require cleaning are processed with the help of the Pennsalt Cleaners . . . a policy adopted only after careful tests had shown the effectiveness of a particular Pennsalt Cleaner for each operation.

One of the Pennsalt Cleaners is Orthosil . . . a product that in the short space of three years brought outstanding economies to heavy-duty metal cleaning operations in virtually every industry. Companion cleaners have been developed for varied and extreme requirements, forming the present group of Pennsalt Cleaners that meet every need with laboratory precision.

They have exceptional dissolving and emulsifying action, tremendous lasting power, and the ability to do a uniformly quicker, more thorough cleaning job, providing excellent surface finish at exceedingly low cleaning cost. These are the advantages that one or more of the Pennsalt Cleaners offer in your own operations. The extent to which they have already earned the confidence of leading manufacturers indicates what you may expect from a test in your own plant. We will gladly furnish full details. Write today to Dept. S. Pennsylvania Salt Manufacturing Company, Widener Building, Philadelphia, Pa.—New York • Chicago • St. Louis • Pittsburgh • Tacoma • Wyandotte.

PENNSALT

CLEANERS FOR INDUSTRY

Other Pennsylvania Salt Chemical Products used in large quantity by industry.

- Anhydrous Ferric Chloride
- Mineral Acids
- Carbon Tetrachloride
- Kryolith
- Sal Ammoniac
- Caustic Soda
- Soda Ash
- Acid-Proof Cements

PENNSYLVANIA SALT MANUFACTURING COMPANY

Chemicals

less time is required for rinsing operations than with still-type tanks. Also, there is less contamination of the working solutions by carryover from one tank to the next. The latter is extremely important in certain types of plating work as only a slight amount of contamination may seriously affect plating quality. Resulting trouble from spotting and staining of finished work is greatly reduced and higher grade, more uniform plating is obtainable.

In one type of spray-rinsing tank, only a light pressure on a foot treadle is required to open the water supply valves. Actual volume of water supplied is determined by other hand-set valves located just ahead of the rapid action valve. With release of pressure on the foot treadle, the flow of water to the sprays is shut off, eliminating waste.

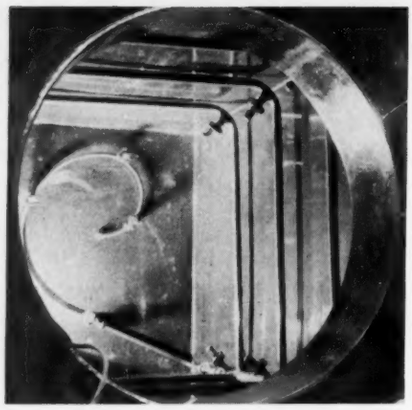


Fig. 5—View into top of spray rinse tank showing arrangement of nozzles, supply pipes, etc.

On general rinsing requirements, one to four seconds is sufficient to place the rack in the equipment, rinse the material and remove rack from the tank. While water sprays are playing on the material to be cleaned, the racks can be turned in a right and left half-circle motion toward and away from general line of vortex and eddy streams to increase and cover more effectively all areas of the work.

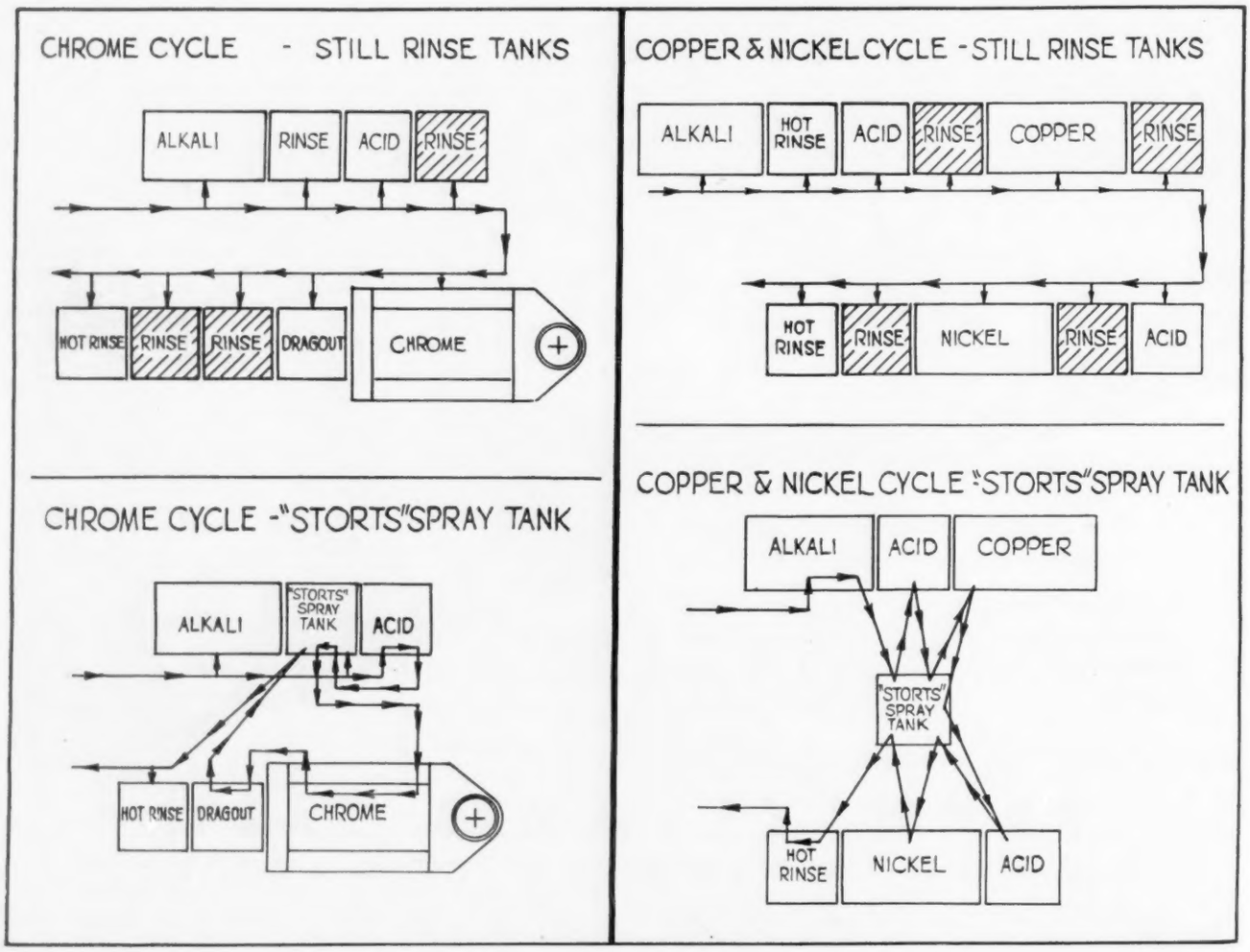
In case where special rinsing problems might require a spraying time longer than usual, the foot pedal can be locked to a position of continuous spray until pedal is tripped again to close the valve.

While the foot-pedal type tank has been used most extensively on rinsing work, need also exists for many of the features found in the hand-lever type of tank. This latter type of tank can be used for righthand approach and lefthand operation or for lefthand approach and righthand operation, the changeover readily being made in two minutes by the simple expedient of turning the tank one-quarter turn and relocating the handle.

The same "direction of process" feature also is provided in the foot-pedal model as the foot-lever mechanism anchoring pads are changeable to permit shifting the coil inlet water supply from one side to the other. The change on this tank is made in four minutes.

Fig. 1 illustrates how economies in saving of floor space in laying out a typical chromium plating cycle is accomplished using the

Fig. 3. (Left)—Cross-aisle arrangement of chromium plating equipment can be changed to spray rinsing with great economies as detailed here. Fig. 4. (Right)—Possibly the greatest savings from adoption of spray rinsing is in cross-aisle setup for copper and nickel plating work. Here four and sometimes five tanks can be eliminated from the lineup



ADVERTISING PAGES REMOVED

spray-rinsing method. The upper portion of Fig. 1 illustrates a conventional "straightline" arrangement and sequence of operations. The various tanks involved are labeled. This is the still-type tank system.

In the lower portion of Fig. 1 is shown how the elimination of two rinse tanks is accomplished by use of the spray-type rinse. This arrangement of spray-type rinse tanks permits the same operations to be handled in the upper diagram without backtracking except in one case. The economy in equipment and floor space is evident.

The savings are even greater in the cross-aisle arrangement shown in Fig. 3. The upper portion here illustrates the usual method of chromium plating cycle arrangement where tanks are placed so work follows a U-path. Lower portion of Fig. 3 illustrates the great savings in equipment and floor space available when full advantage is taken of the spray-rinse method. Here, as will be noted, three rinse tanks are eliminated, reducing total number of tanks in the cycle from nine to six.

Fig. 2 shows typical layout of a straightline copper and nickel electroplating cycle. In upper portion is the usual still-type rinse arrangement. In lower portion of Fig. 2 is shown how two of the rinse tanks are eliminated by using the spray method.

Fig. 4 shows what possibly is the most important saving available from use of the spray-rinse method. Here the cross-aisle arrangement of copper and nickel electroplating equipment has been changed to a type of X-arrangement, eliminating four rinse tanks and thereby greatly raising efficiency of the operations, reducing floor space, cutting handling work and at the same time saving water and producing work of a better quality.

By placing the rinse tank between the two lines of other equipment as shown in lower portion of Fig. 4, a most effective arrangement is provided. In this manner the rinse tank is only a short distance from each of the other tanks, so rinsing after each of the other operations can be accommodated quickly and easily. This permits one spray tank to replace as many as five other rinse tanks of the still-type in such electroplating layouts as the one shown.

Clear Metal Finish

■ Clear finishes for industrial use are announced by Finishes division of E. I. du Pont de Nemours & Co., Wilmington, Del. Known as the RC-900 Line, these finishes are based on clear methacrylate resins and are claimed to deposit a glossy, water-white film. They may be applied by any of the usual methods such as spray, brush or dip.

For use on smooth metal objects, these finishes are said to afford good adhesion and flexibility when applied over the clean bare metal and to be durable under out-door exposure, particularly on nonferrous metals. The finishes dry rapidly by evaporation, leaving a hard nonyellowing film which is resistant to acids, alkalies and alcohol.

Adjustable Louvers Increase Ventilating Hood Efficiency

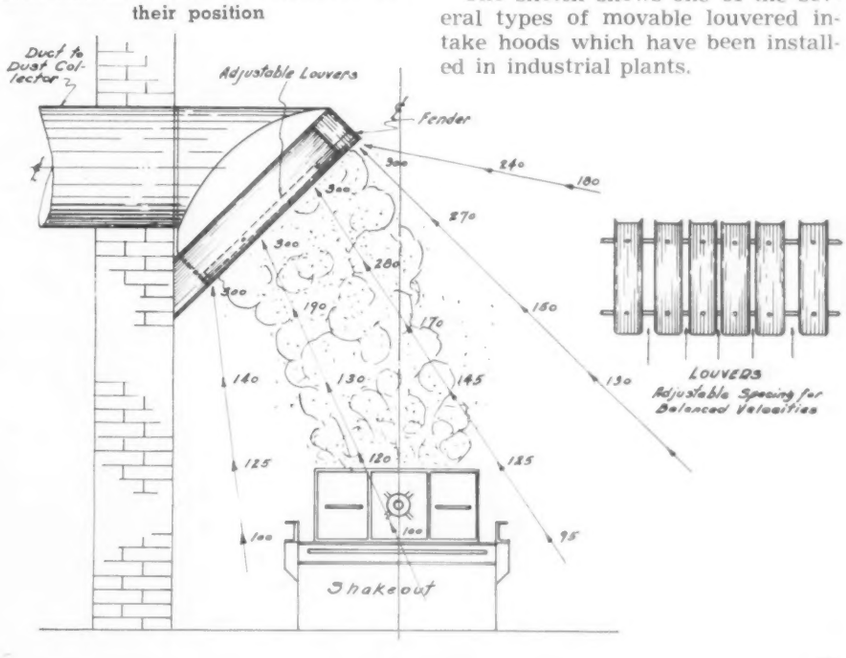
■ THE IMPORTANCE of having dust collector terminals properly hooded to provide efficient intake of dust and fumes has been shown in case studies made by John G. Liskow, chief engineer, Claude B. Schneible Co., 3955 Lawrence avenue, Chicago. Three types of operations were studied: Foundry shakeouts, spray booths and heating furnaces. Dust, soot and fumes arising from these operations were observed, their travel charted and a check made of accumulations that failed to enter the duct. It was found that particles not coming within a certain range of the intake duct were not removed from the plant atmosphere, but were left to settle around the operation and that extending the intake over a greater area brought the evading dust particles and fumes under control.

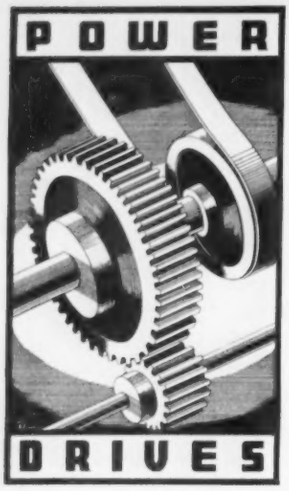
Three factors were found to affect the proper operation of the exhausting hoods: (1) Natural drafts which vary from season to season according to plant ventilation, (2) reflex action of fumes after impact, such as in spraying, which cause fumes and particles to go to either side of hood, (3) size of work which, as in the case of bulky objects, causes flow to be deflected to sides of hood or above it. To cope with these factors, a set of movable louvers were placed in the intake opening. The louvers, round-corner slats sliding on a rack, could be adjusted for various conditions. Where dust and fumes have a tendency to go right or left, the louvers can be moved toward the middle, closing off the plenum chamber at the center and pulling the dust in from the two sides. In other cases (to counteract drafts, etc.,) louvers can be set almost tight together on one end and spaced well apart at the other toward which dust is naturally drafted. The flexibility and adjustability of these louvers provides for quick changes to conform to variations in conditions.

The best location of the hood itself was determined to be above and to one side of the operation with curtains hung on the sides and back to prevent eddy currents from reaching the work. Exhaust ducts from the plenum back of the louvers can be taken upwards, downwards or sideways, as required by the application.

The sketch shows one of the several types of movable louvered intake hoods which have been installed in industrial plants.

This dust collector hood has louvers in its intake opening which are adjustable to compensate for drafts, size of work and nature of operation. Figures indicate relative air velocities and their position





How Much Safety?

Use of even a small safety factor when calculating drives is shown to be highly profitable. Graphic presentation details typical methods of working out drive applications and use of safety factor

By J. N. SMITH
Manager
Leather Technical Sales
Department
E. F. Houghton & Co.
Philadelphia

■ ANY ENGINEER who designs a steam engine, bridge, building or hydraulic press uses a safety factor.

Similarly the intelligent application of power in transmission drives recognizes the necessity for a safety factor. However, the question of "how much" often leads down unknown paths.

The usual method of belting a drive is to compute the horsepower required for the equipment. Then the belt manufacturer's horsepower tables are consulted and size of belt is calculated for the load. Conclusions reached are often verified by checking with the belt manufacturer.

While this method may be satisfactory for some drives, it does not take into account such factors as type of motor, speed and torque characteristics, type of driven-equipment, load characteristics and last but not least, diameter of the drive pulley. Consider a motor driving a line shaft. When the drive was first designed, the engineer undoubtedly considered all these factors and so experienced no trouble. But in the meantime, business may have increased and more machines added to the line shaft, thus increasing the load until the belt may slip and burn.

When this occurs the transmission man is called in as the belt may be blamed for the trouble. In checking the drive, the belt man asks the horsepower of the motor, speed of motor and pulley diameter. Right here often is where the first mistake is made. It is as important to know the maximum torque which the motor can exert as it is to know the horsepower of the motor. In fact, it may be more important because it is this figure which determines the maximum pull on the belt.

Each size and type of motor is equipped with a nameplate stating its horsepower rating. However, this is the minimum rating and indicates that the manufacturer guarantees the motor to develop at least that much horsepower. It does not indicate the maximum load the motor will carry without stalling, nor the maximum torque in foot-pounds. Since each size and type of motor has different characteristics and overload capacity, the factors just mentioned are extremely important and should be taken into account when calculating the belt drive by using a safety factor.

Determine from the motor manufacturer the "safety factor" or actual maximum horsepower the motor will carry. Then use this

From *Research Illustrated*, a publication of E. F. Houghton & Co., Third, American and Somerset streets, Philadelphia.

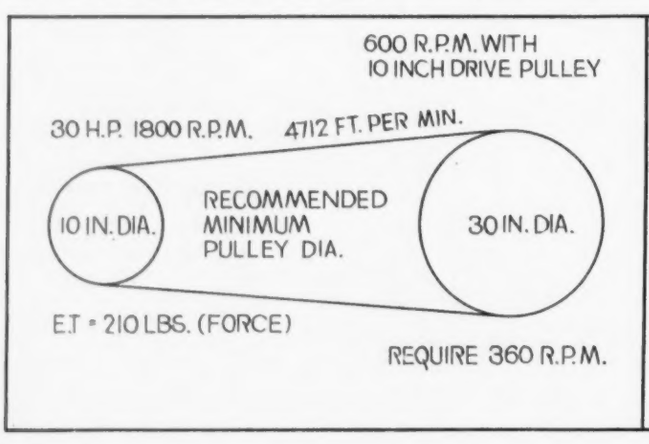


Fig. 1—Manufacturer recommends 10-inch pulley but this gives 600 revolutions per minute at driven pulley

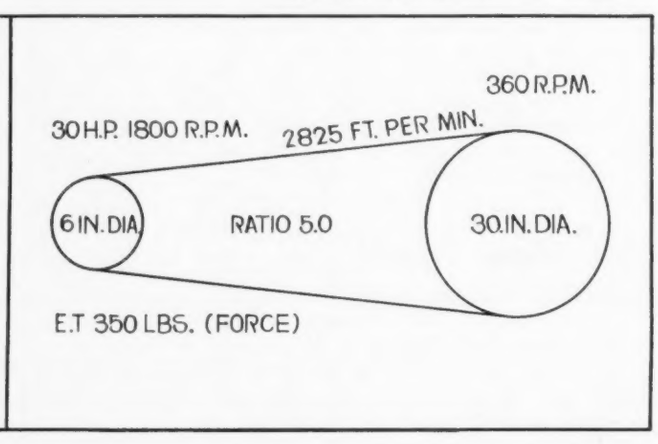
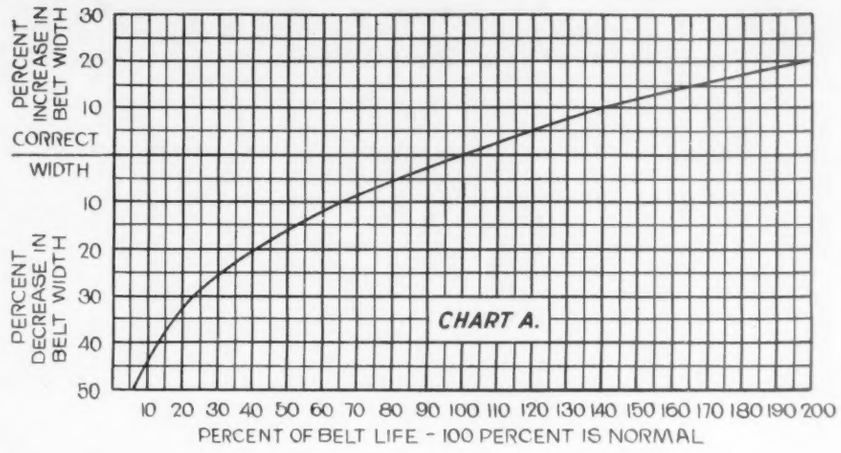


Fig. 2—Desired driven pulley speed obtainable with 6-inch pulley but gives excessive belt tension and flexure



same "safety factor" or peak figure when figuring the belt drive.

Then again suppose the additional drives added to the lineshaft have been taken care of by increasing the size of the motor. Probably the belt drive from motor to lineshaft remained the same. If this was the case, trouble can be expected sooner or later.

Of course it is not necessary to allow for the maximum horsepower on certain types of equipment. Thus it is extremely important that the transmission engineer be acquainted with the driven equipment and know something of its load characteristics.

However, in any case it is more common to underbelt a drive than to overbelt it. Many believe that underbelting is economy. A careful examination of figures will show that this is not the case.

For instance, in Chart A, the width of belt in contact with the pulley is plotted against belt life, with 100 per cent representing normal life. By underbelting a drive 20 per cent, initial cost is cut 20 per cent. On the other hand, belt stresses are increased resulting in decreasing the belt life by 59 per cent, to say nothing of the increase in maintenance cost and lost production due to belt slip.

Contrast this with use of a 20 per cent safety factor, or overbelting by 20 per cent. The added 20 per cent spent for this drive pays big dividends by almost doubling the belt life as well as giving low maintenance cost and increased production. Chart A permits quick and easy calculation of effect of over and underbelting.

Pulley diameter also enters into the matter of belt life and so must be considered when checking a drive for safety factor. Some may question how the value of pulley diameter enters into the equation other than to give a slower belt speed which, of course, lowers the horsepower capacity of the belt. The answer lies in the fact that internal friction is set up in all belts due to flexing around the pulleys. The smaller the pulley diameter, the greater will be the bend or internal friction. Furthermore, the smaller the motor pulley, the greater will be the effective tension or force required to transmit the load.

Motor manufacturers recognize this fact and emphatically specify a minimum pulley diameter for each size, speed and type of motor. However, the pulley size specified is a *minimum*, and if a safety factor is to be incorporated the actual pulley should be of large diameter.

Here is a common example. A machine requires a 30-horsepower induction-type motor and is equipped with a 30-inch-diameter driven pulley. Driven speed is to be 360 revolutions per minute. With a motor rated 1800 revolutions per minute, the proper driven speed

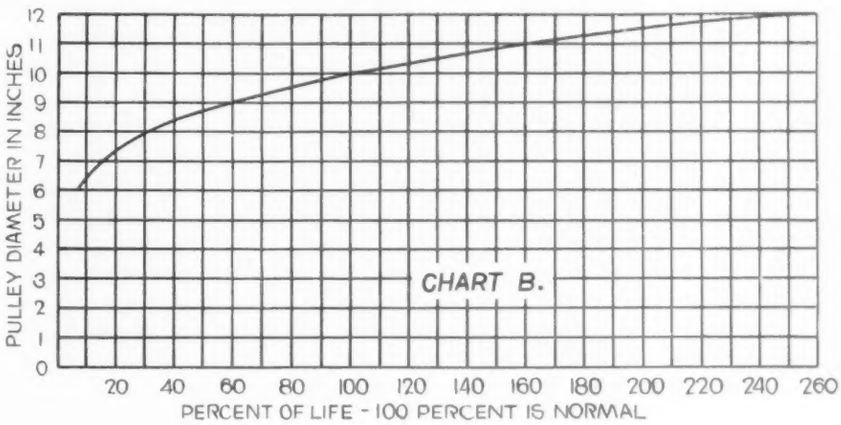
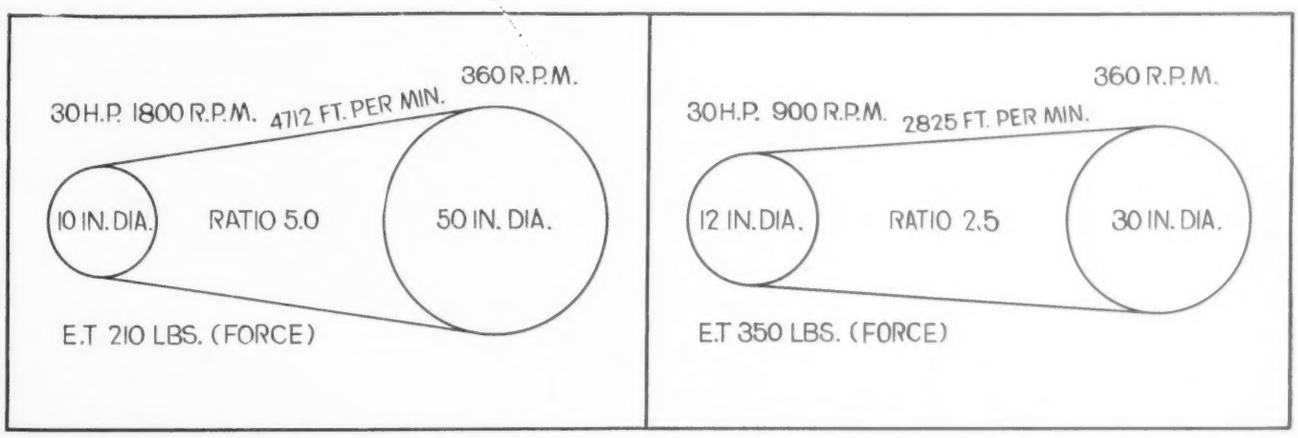


Fig. 3—Desired speed obtained with recommended motor pulley by using larger driven pulley

Fig. 4—Desired speed also obtained with smaller driven pulley by use of a lower speed motor



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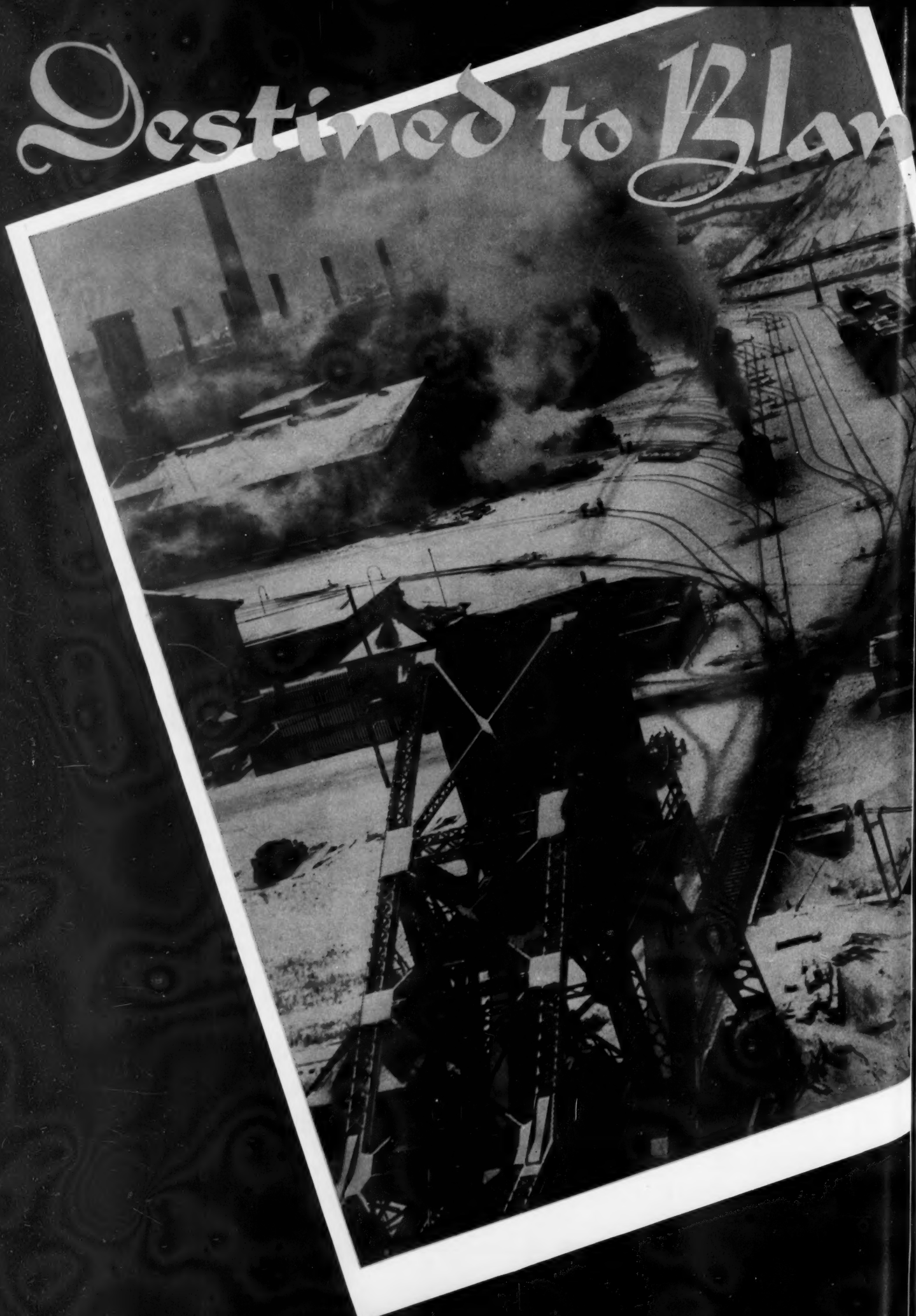

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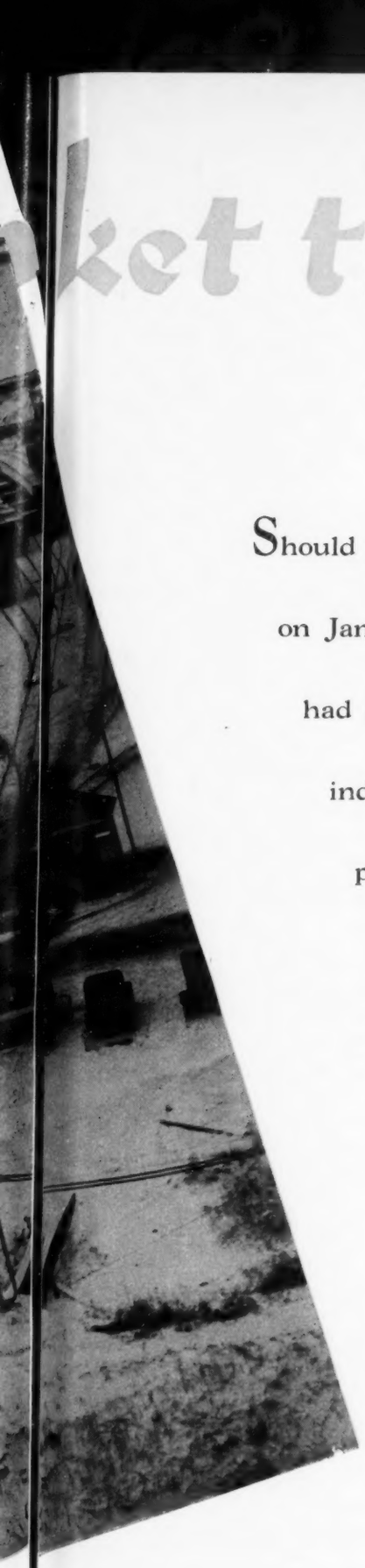


Should a heavy mantle of snow blanket the metalworking industries on January 1, 1940, we swear Dame Nature alone will have had a hand in it . . . but, STEEL's thorough coverage of the industry beginning on the same day will be an act of publishing effort and ingenuity . . . for that day shall herald STEEL's "Yearbook of Industry" issue . . . destined to wend its way into the hands of over 60,000 individuals of varying degrees of authority in the iron, steel and metalworking industries.

Any worthwhile advertising message in this issue is bound to have a receptive audience.

STEEL's

1940 Yearbook Issue

dictates use of a 6-inch-diameter motor pulley. However, this is going to cause trouble as the standard pulley diameter as recommended by motor manufacturer is 10-inch, see Fig. 1.

What happens when a 6-inch motor pulley is used is depicted in Fig. 2? The belt speed has decreased which naturally decreases the capacity of the belt. Effective tension has increased as has the severity of the belt flex.

Two Solutions Possible

One of two solutions is possible. The first solution is to increase the sizes of the driven pulley. If this is impossible, a slower speed motor may be employed, using the proper diameter motor pulley for that speed.

Referring to Fig. 3, it is noted that to increase size of driven pulley so that it will be driven at 360 revolutions per minute using a 10-inch-diameter pulley on the motor, the size of driven pulley must be 50 inches in diameter. While pulley ratio remains the same as in Fig. 2, both belt speed and effective tension now revert to the same values noted in Fig. 1.

The other possibility is illustrated in Fig. 4. Here a slower speed motor is used, 900 revolutions per minute, employing a standard pulley diameter of 112 inches. This would permit the use of the 30-inch driven pulley. Result is a slower belt speed at higher effective tension of 350 pounds as found in Fig. 2. However, the pulley ratio is lower with greater arc of contact on small pulley and less severe flexing. Either solution diagrammed in Figs. 3 or 4 would be satisfactory for this application.

How safety factor enters in calculation of pulley sizes is shown graphically in Chart B. Here it will be noted that a 10-inch diameter pulley is recommended for the motor at 1800 revolutions per minute resulting in a normal or 100 per cent belt life. By following the curve, it is possible to determine just what may be expected in belt life for this particular drive if the pulley diameter was decreased to a minimum of 6 inches, shown as starting point of the curve. At this point belt life is only somewhere around 7 or 8 per cent of what it should be. Decreasing pulley diameter from 10 to 9 inches is shown to cut the life to 60 per cent normal.

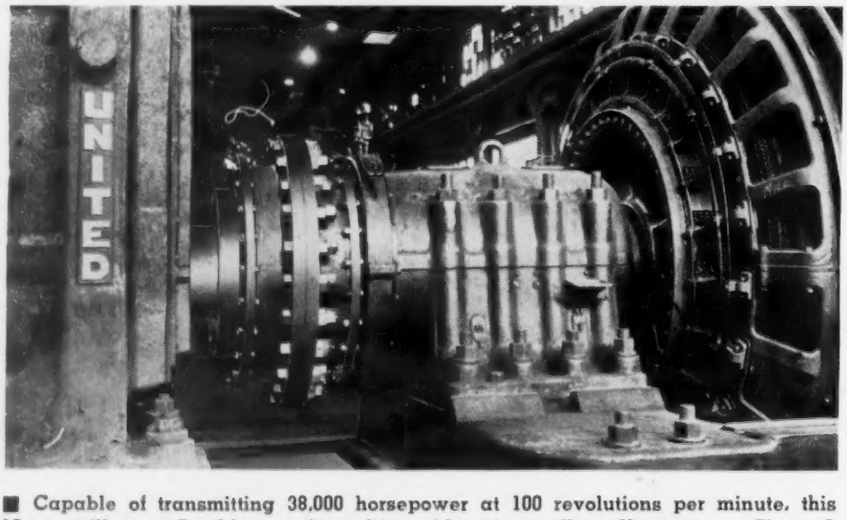
On the other hand, increasing the pulley diameter by 1 inch gives a belt life of 160 per cent normal, a nice return on the slight investment involved, to which of course must be added the more satisfactory operation of the drive with less maintenance and better operation of the driven machine.

Never Use Minimum Diameter

A good policy to follow is never to use a minimum pulley diameter recommended by the motor manufacturer but to use something larger. It is much more economical to accept the standard pulley diameter specified as an absolute minimum and to try to exceed it if at all possible.

Belt life is dependent on three factors. These are the number of flexes, the severity of flex and the amount of belt tension or stress. In designing any belt drive, these three factors must be given careful consideration as to their effect on belt life and production. Use of even a small safety factor will be found a wise course in any instance, and quite often safety factors from 20 to 50 per cent are easily justified from better operation of the drive, lower maintenance and higher output of driven machine.

Blooming Mill Drive Uses Large Flexible Coupling



■ **Capable of transmitting 38,000 horsepower at 100 revolutions per minute, this 15-ton mill type flexible coupling drives blooming mill at Youngstown Sheet & Tube Co., Indiana Harbor, Ind. Outside diameter is 77 inches; bore of motor half 24½ inches and of driven half 25¾ inches. The 3-inch center flange bolts are body fitted. Photo courtesy Poole Foundry & Machine Co., Woodberry, Baltimore**

Steam Engine Classic In Centennial Edition

■ *History of the Growth of the Steam Engine*, by Robert H. Thurston; cloth, 555 pages, 5 x 8 inches; published by Cornell University Press, Ithaca, N. Y.; supplied by STEEL, Cleveland, for $3.

First published in 1878, this work ran through six editions, the latest in 1907. It was deemed appropriate to issue the present edition in observance of the one-hundredth anniversary of the author's birth, which was celebrated at Cornell, N. Y., Oct. 25, 1939.

Although later books on the same subject have been published in the meantime, this volume is considered a classic for the period of history it covers and it is still in demand, though few copies are available.

The original work embodied the more generally interesting portions of lectures first written for delivery at the Stevens Institute of Technology in the winter of 1871-72 before a mixed audience, principally engineers and mechanics.

A wealth of illustrations preserves many drawings and diagrams culled from earlier writings. Through this means these are preserved for the future where otherwise they might have been lost from sight.

The present volume contains a brief supplementary history by W. N. Barnard of the Sibley school of mechanical engineering, Cornell university, covering the period from 1870 to 1939. This includes development of the steam turbine and the steam generator. A complete index gives access to the wealth of material in the text.

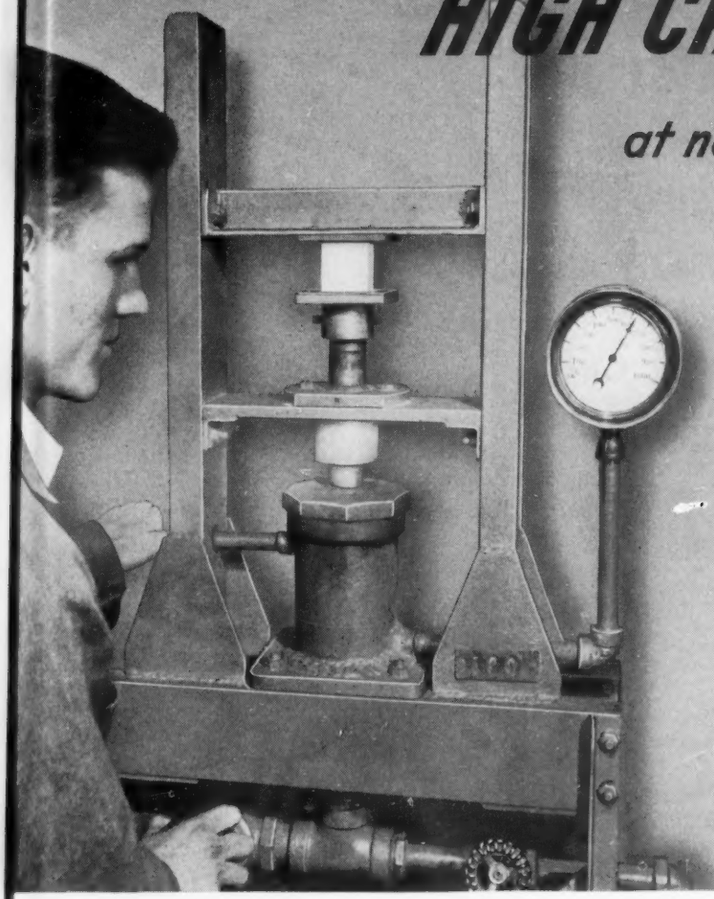
♦

Core And Mold Wash

■ A super refractory, T.A.M. Zirconite "A", furnished ready for use as a core and mold wash in place of other less refractory materials where such materials burn into the cast metal has been put on the market by Titanium Alloy Mfg. Co., Niagara Falls, N. Y. The compound is milled to 325 mesh and has a melting point above 3775 degrees Fahr.

HIGH CRUSHING STRENGTH

at no sacrifice in thermal efficiency



Tests prove Armstrong's Insulating Fire Brick will withstand heavy strain in furnace construction

REGULAR AND FREQUENT TESTS of Armstrong's Insulating Fire Brick are made in this machine to be sure that all brick meet the high standard for crushing strength. Heavy-duty brick stand pressures up to 450 pounds per square inch.

THIS CAR-BOTTOM FURNACE of the Wycoff Steel Company, Chicago, is lined for maximum efficiency and strength with Armstrong's Insulating Fire Brick. Furnace Builder: Surface Combustion Corporation, Toledo, Ohio.

EFFICIENT high temperature insulation must be sufficiently strong to withstand, with a margin of safety, the stresses due to direct loading or thermal expansion. Extensive laboratory tests and practical experience have proved that Armstrong's Insulating Fire Brick have this necessary high crushing strength. That's why leading manufacturers use these brick for every type of furnace designed for operation at from 1600° to 2600° F.

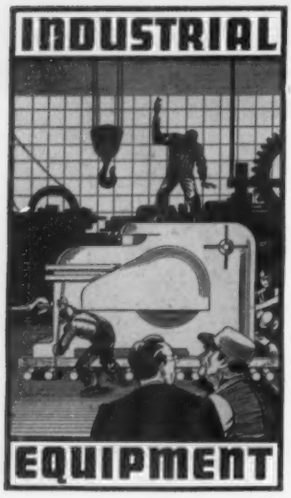
Years of satisfactory performance have shown that Armstrong's Insulating Fire Brick conserve fuel, increase operating efficiency, and promote accurate temperature control. They possess all the essential requirements for efficient service—*low thermal conductivity, high physical strength, uniformity in size and composition, low shrinkage, and ample refractoriness for the use intended.*

To meet actual service conditions, Armstrong has developed *five* individual brick of varying characteristics—each ideally adapted for a specific service. These five brick are known respectively as N-16, N-20, EF-22, A-25, and EF-26. Armstrong engineers will be glad to recommend the proper brick and cements for individual installations.

Find out more about the complete line of Armstrong's High Temperature Insulation. For literature, samples, and prices, just write to Armstrong Cork Company, Building Materials Division, 985 Concord Street, Lancaster, Pa.

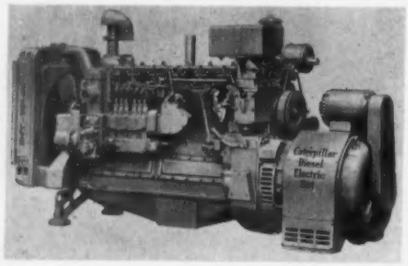
Armstrong's HIGH TEMPERATURE INSULATION

INSULATING FIRE BRICK • HIGH TEMPERATURE BLOCK • PLASTIC CEMENTS • DIATOMACEOUS EARTH



Power Plant

■ Caterpillar Tractor Co., Peoria, Ill., offers models 46-30 power plant of 30-kilowatt capacity. Set includes a 6-cylinder Diesel engine and has all electrical equipment inbuilt except a circuit breaker. Engine has only three operating adjustments,



none of which involves the Diesel fuel system. Generator is of single unit construction, with ball bearings. Built-in regulation enables the set to pick up large motor loads with little light flicker and voltage drop.

No rheostats, switchboards, instruments are needed with the set. Because units of this capacity are almost always operated close to the power destination, a voltage regulator is not necessary.

Pilot-Controlled Valve

■ Ross Operating Valve Co., 6488 Epworth boulevard, Detroit, announces an all-air, pilot-controlled valve for semiautomatic control, full automatic control or remote control of double-acting air-cylinders. It is claimed that this new system

is well suited to series of successive operations demanding rapid and accurately timed progressive movements, such as for spot or seam welding or automobile body parts.

Valve is actuated by pilot controls, which are made in various designs as hand, foot, or mechanical action with a push, cam, toggle or others.

Hack Saw Frame

■ Bonney Forge & Tool Works, Allentown, Pa., announces No. 2628 full nickel finish adjustable hack saw frame accommodating blades from 8 to 12 inches long. Blades may be faced in four directions. Checkered steel pistol grip fits comfortably in the hand.

Bonney also has added a full line of 10 and 12-inch tungsten alloy

steel blades in coarse, medium and fine series with flexible back and hardened teeth to take care of all ordinary cutting jobs.

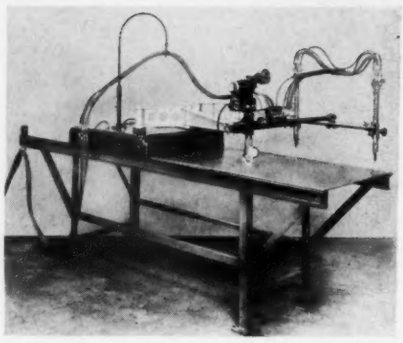
Mercury Pressure Gage

■ Connelly Iron Sponge & Governor Co., 3154 South California avenue, Chicago, has introduced a mercury pressure gage. Body of gage is of cast semi-steel. Tube, is unbreakable glass substitute threaded directly into casting. Wide-angle visibility for reading on black-etched

aluminum scale is provided. Scale is graduated from 0 to 3½ pounds on one side and 0 to 56 ounces on the other.

Gas Cutter Has Wide Flexibility

■ Airco No. 10 Planograph announced by Air Reduction Sales Co., 60 East Forty-second street, New York, is said to gas cut straight lines, rectangles, circles and irregular shapes from ferrous metal of any thickness within present practical limits of the cutting torch. Al-



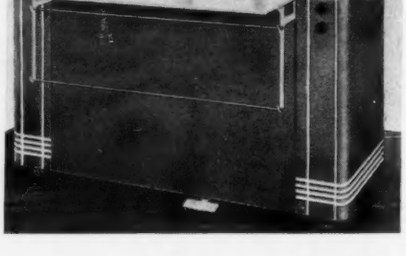
though of stationary type, this machine can readily be moved by crane.

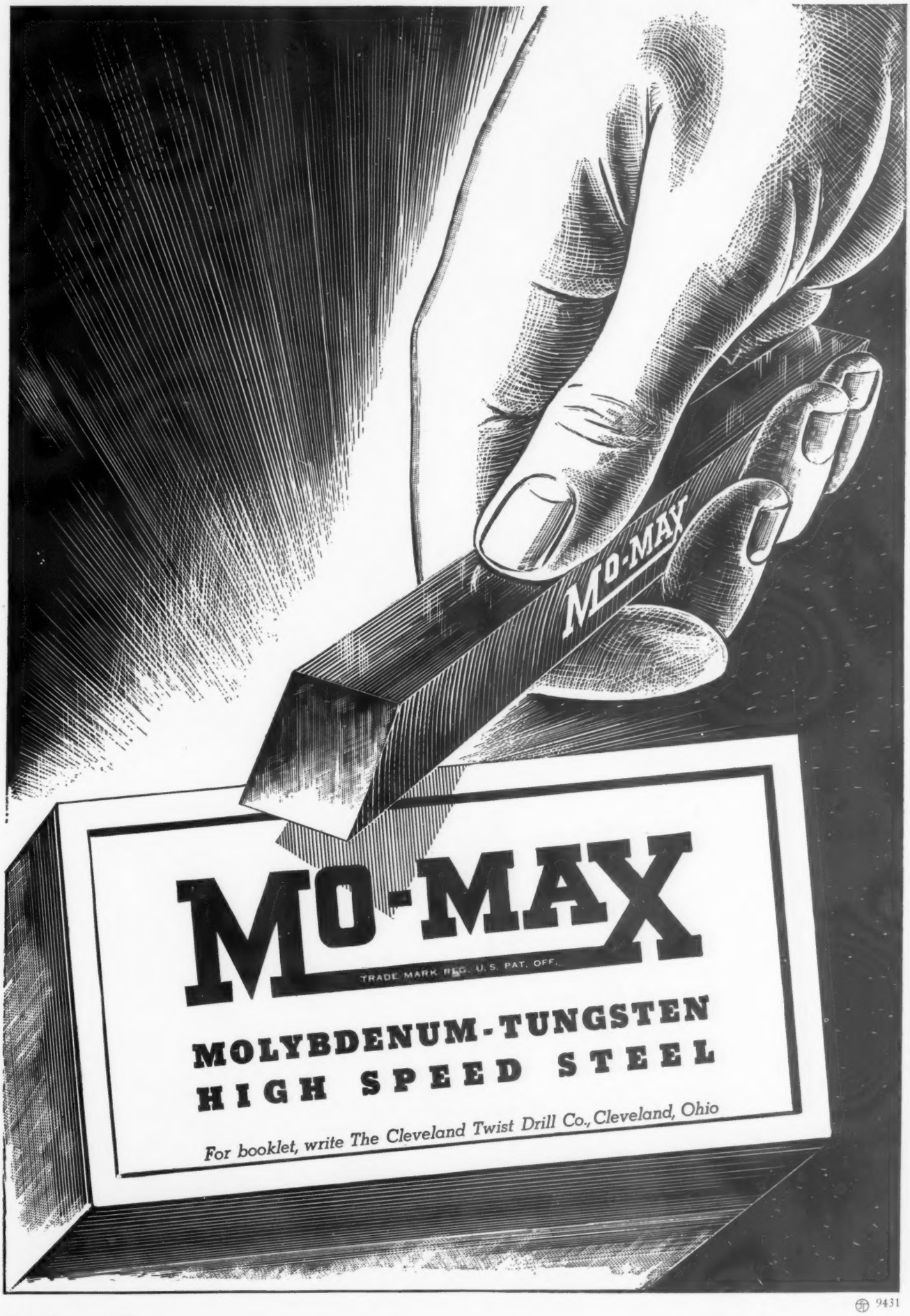
Torches and tracing devices are supported on a carriage traveling on a tracing table. Planograph operates on 110 or 220-volt alternating or direct current and requires working area of 5½ x 10½ feet. Cutting range in single torch operation is 24 x 72 inches, and length can be increased indefinitely in multiples of 72 inches by using additional tracing tables. Maximum diameter of circles cuts is 24 inches. When two torches are mounted on regular operating bar, each has a cutting area 12 x 72 inches and each can cut a circle up to 12 inches in diameter.

Tracing device for manual tracing can be locked to travel in a straight line in any desired direction. Gas control unit is centrally located. Knob handle operates cams, progressively arranged, one each for pilot light, acetylene (or other fuel gas), oxygen preheat and cutting oxygen. One complete cycle lights and cuts off in proper sequence.

Mercury Quartz Lamp

■ A new type blue print machine employing a high-pressure mercury quartz lamp will be ready for the market shortly after Jan. 1, according to officials of Charles Bruning Co. Inc., 100 Reade street, New York. Quartz lamp is said to give positive, uniform distribution of light to entire printing surface without flickering and to eliminate the necessity of changing and trimming carbons. Current consumption of the new printer is claimed

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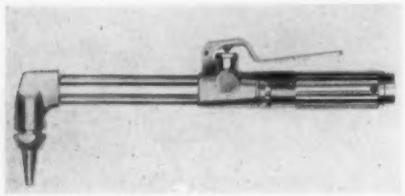
to be 1/3 that of a carbon arc machine of equal capacity. Test runs on a model of this machine have been made at a speed of 20 feet per minute from new pencil and ink tracings using medium speed blue print paper.

Mechanical innovations in safety, improved feeding, speed control, drive, elimination of tracing slippage and wear, making for easier, faster and more economical operation, are also anticipated. The new machine will sell for under $1000.

Welding and Cutting

■ A new line of Prest-O-Weld welding and cutting apparatus introduced by The Linde Air Products Co., 30 East Forty-second street, New York, includes a welding blowpipe, cutting blowpipe and cutting



attachment. Individual mixers in every head of the W-108 welding blowpipe illustrated make correct flame adjustment easy and give definite resistance to flashback. Both oxygen and acetylene for this "balanced-pressure" blowpipe may be set at approximately same pressure in pounds per square inch as the number of head.

Welding heads provide a long, slender flame with a well-formed inner cone which permits thorough heating of V-bottom and provides good control of welding puddle. On the new C-108 cutting blowpipe and CW-108 cutting attachment, a lower preheat oxygen pressure permits a large flame for cutting very dirty or heavily scaled material. They also have improved flashback resistance.

Adjustable Die Head

■ A small, four-chaser, solid adjustable die head, the EJ5, is offered by Geometric Tool Co., New Haven, Conn. Chasers are adjustable within the die head, thus allowing production of the exact decimal fit desired. Chasers may be removed for resharpening by removing the face

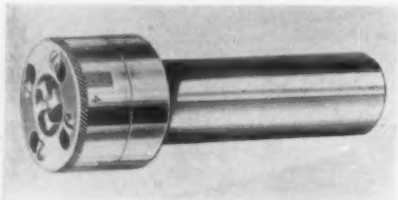
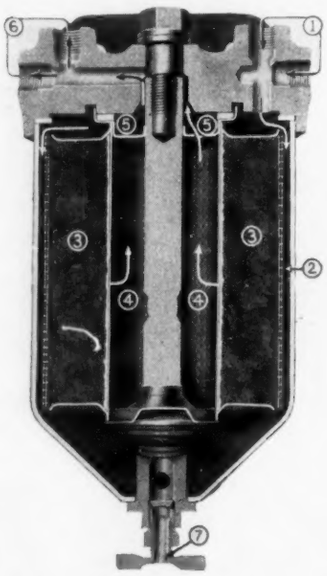


plate. Overhanging projection chasers of high-speed steel are furnished as standard. This facilitates shoulder threading and brings chasers out beyond face plate for ease in setting up.

One inch in diameter, die head weighs less than 5 ounces with chasers. It is equipped as standard with a nonreleasing floating shank. The tool has a forward float allowing for an even start and makes possible production of accurate threads on small diameters and fine pitches without use of accurate camming. Die head is built in one size only with a threading range from No. 0 to No. 10 in threads up to 100 per inch.

Oil Filter

■ AC Spark Plug division of General Motors Corp., Flint, Mich., has developed Type T-1 oil filter for machine tools to remove all solid impurities such as fine metal chips, etc., from oil. Unfiltered oil enters at 1; flows into case, 2; is forced

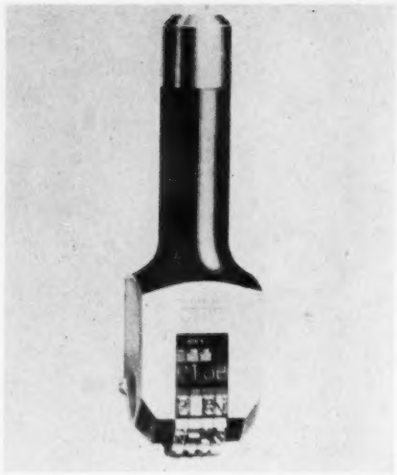


through filtering element, 3; and enters collector tube, 4. Clean oil passes through annular passage, 5, and is discharged through outlet, 6. Drain cock, 7, is provided for draining accumulated dirt and water from sump.

Numbering Machine

■ A small hand numbering machine for stamping unhardened steel and other metals by use of a hammer or rawhide mallet is offered by H. O. Bates, Elizabeth, N. J. Six ⅛-inch numbers go within ½-inch left to right space and six 1/32-inch numbers within ⅜-inch left to right space.

Device is made entirely of tool steel and hardened with the head drawn and tapered to face. Wheels



are minmium size for easy positioning of mark. A hand hook for turning wheels is furnished, but wheels can also be turned with the fingers.

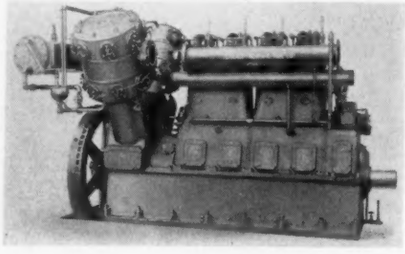
Standard sizes are 1/32, 3/64, 1/16, 5/64, 3/32, 7/64 and ⅛-inch. Three-wheel machine costs $50, and ten-wheel machine $116.50.

2-Stage Air Compressor

■ Chicago Pneumatic Tool Co., 6 East Forty-fourth street, New York, offers class W-CO air compressor consisting of a double-acting, water-cooled compressor on a common crankshaft and base with a Chicago Pneumatic heavy-duty diesel engine. Vertical arrangement of engine cylinders provides a separate crank pin for each connecting rod and complete accessibility to all bearings, and minimizes the number of wearing parts.

Compressor has a large valve area, three-step and five-step capacity regulation and effective intercooling. Engine features Bosch system of direct injection, streamlined valve chambers and individual fuel pump for each cylinder. Direct transmission of power from engine to compressor prevents intermediate losses. Full force feed lubrication with filter and cooler is provided. Simplate valves with straight lift eliminate bending and rubbing.

High compression efficiency and engine economy combine, it is said, to give a low fuel cost per unit of capacity. Standard sizes of two-stage compressors are available in



capacities of 662 to 2000 cubic feet per minute for pressures of 80 to 125 pounds, with other sizes and types available for lower and higher pressures. This compressor is recommended for continuous, heavy-duty operation in either stationary or semiportable service.

Lamp Transformers

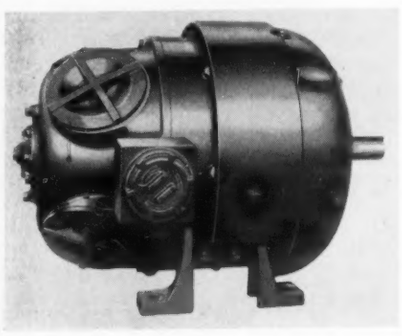
■ Jefferson Electric Co., Bellwood, Ill., announces two types of mercury-lamp transformers, each of which operates two 400-watt lamps. The indoor type is rectangular for wall or post mounting with brackets for easy installation, and with terminals made accessible by means of small doors at top and bottom. The weatherproof pole-mounting

transformer shown here has terminals accessible at the bottom and three threaded hubs so that up to three fixture mounting supports may be used. These transformers, serving two lamps, reduce installation costs where numbers of lamps are used in the same room or location.

Explosion-Proof Motors

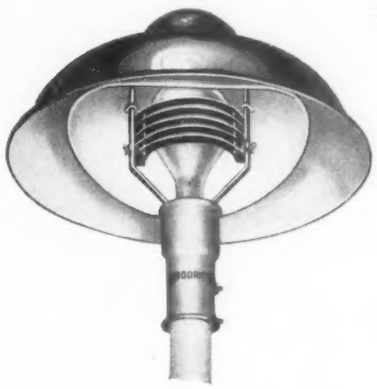
■ Reliance Electric & Engineering Co., 1088 Ivanhoe road, Cleveland, announces explosion-proof direct-current motors in sizes from 1 to 75 horsepower, tested and approved by Underwriters' Laboratories Inc. for Class 1 Group D hazardous locations. These motors are of enclosed, fan-cooled design with ball bearings and are designed to operate safely in places made dangerous by the presence of gases and vapors such as are produced by methane, acetone, benzene, the various alcohols, common pyroxylin solvents and the vapors of various petroleum distillates, including gasoline.

If gas or dust inside the motor enclosure should become ignited, resulting flame is prevented from escaping to outside air. Motor enclosure has ample strength to withstand without bursting or loosening of joints the highest internal pressure which might develop in the event of an explosion of gases such as those present about the motor. The construction of the motor is such that in the event of a burnout, motor enclosure will not reach a temperature sufficient to cause surrounding vapors to ignite.



Reflector

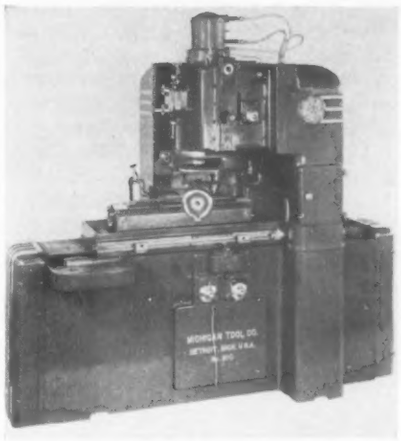
■ The Angle Standlite, a reflector announced by Goodrich Electric Co., 2901 North Oakley avenue, Chicago, illuminates smaller areas without need for high-wattage lamps and so is suitable for bridges, lot corners, driveways, alleyways and housing projects. It regulates the distribution of light, trimming it sharply to the ground in one direction and projecting it in the other by means of an adjustable inner reflector and a



semicircular louvre attachment. Mounted from 10 to 12 feet high, this reflector produces uniform high-intensity lighting over the surrounding ground area, while windows of adjacent buildings are protected from glare. Porcelain enamel finish is permanent and can be cleaned with a damp cloth.

Hydraulic Gear Finisher

■ Michigan Tool Co., 7171 East Six Mile road, Detroit, offers model 900 completely hydraulically operated heavy-duty high-production gear finisher operating on crossed-axis "shaving" method of cutting. Gear is cut by serrated cutters in reciprocating horizontal rack with which gear is "meshed" by feeding work carrying head downward toward rack. Down-feed mechanism comprises a rapid approach and slower cutting feed adjustable by single valve from 0.0005 to 0.0025-inch per cycle of the table. Dial setting automatically stops rack after desired number of "finishing" strokes. Coolant system consists of six compartments in series providing for progressive deposition of foreign matter and filtering. Unit finishes gears up to 8-inch diameter with maximum length between centers of 18½ inches.



Steel Stitcher

■ Seybold division of Harris Seybold Potter Co., Dayton, O., announces a steel stitcher capable of driving wire stitches through 0.060-inch of steel. In fastening various materials to sheet steel, a total thickness of ¾-inch can be stitched, and stitches can be driven within ⅜-inch of an upward rising flange, front or back and within ⅛-inch of downward projections.

By means of a heavy spring support in the arm, minor variations in thickness of stock can be handled without adjustment of arm. Extra space under stitcher head is said to increase range of work and facilitate handling. Double-action treadle is adjustable by turn of a knob for either nonrepeat or continuous stitching. Sight feed oilers lubricate points of heaviest duty.

Machine provides such support for the stitch that, if a hard grade of wire is used, the wire is said to punch slugs from metal. Work-

supporting arms available include drop goose-neck arm, straight arm with adjustable spring support and double end clincher, drop goose-neck arm with reverse clincher, reverse goose-neck arm and overhung arm.

On machine with 20-inch throat, standard height of machine stitch to floor is 42½ inches, standard height of machine overall being 67½ inches. Width of stitch measured between legs of stitch is 1½ inches.

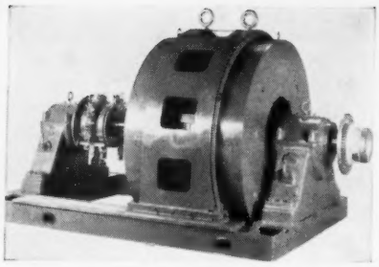
Wheelbarrow Tire

■ A solid wheelbarrow tire, 16 x 3 Vulc-On, cured directly to the wheel, for operations where tires are exposed to excessive abuse is announced by B. F. Goodrich Co., Akron, O.

The wheelbarrow wheel for pneumatics, Goodrich Nu-Seal, with bearings sealed against dust and dirt to prevent wear on bearings and axles, designed for heavy-duty service in brick plants, pottery firms and other ceramic industries is also being put on the market.

Induction Motors

■ Pedestal-type wound-rotor induction motors are being built by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., in sizes from 250 to 5000-horsepower. To withstand conditions on rolling mills, hoists and similar applications where high starting torque, frequent starts and stops, reversing service and abnormally high peaks are common requirements, box-type cast-iron and fabricated steel frames are used with supporting feet near the horizontal center line of the frame to give the stator the necessary strength and rigidity. Screws and liners on motor feet permit horizontal and vertical adjustment of stator.



To withstand electrical strains, the rotor coils are insulated for double voltage and are made of two straps side by side, each strap formed to exact shape and completely insulated before assembly. This construction gives a high power factor without the disadvantage of a small mechanical air gap and permits use of completely formed and insulated coils.

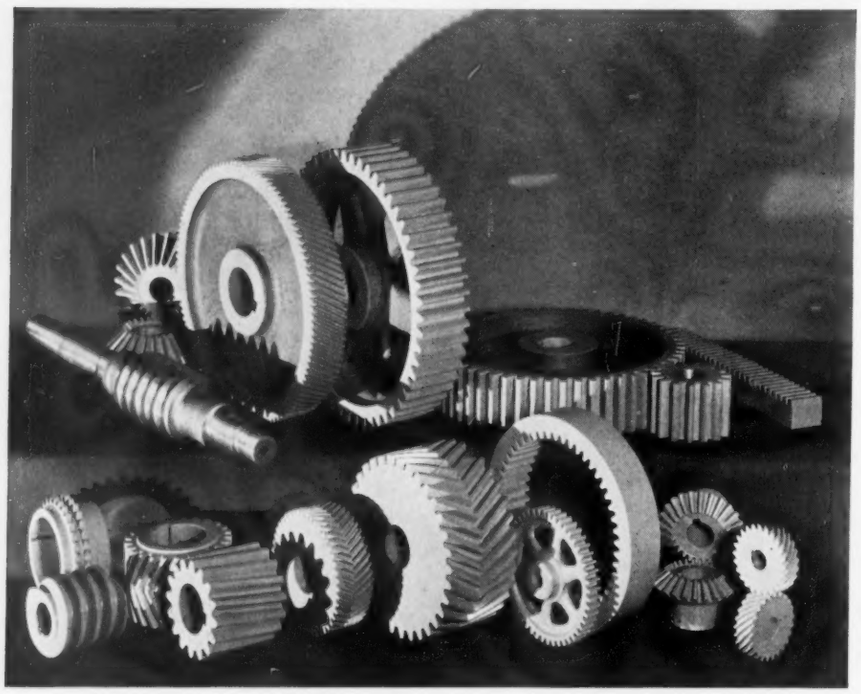
Welding Helmet

■ A light-proof seamless welding helmet, No. 406, is announced by Chicago Eye Shield Co., 2300 Warren boulevard, Chicago. This helmet is made in one piece from vulcanized fiber without use of rivets. It has two reinforcing ribs on each side molded in the fiber for strength and rigidity without warping.

Cover glass or welding lens can be removed or replaced without the use of tools. The head gear can be adjusted to required size and once adjusted, will remain in position until changed. Wearing comfort with even weight distributed is assured.

Wire-Wound Resistors

■ A new compact design of "Ohiohm" ceramic-insulated resistance unit announced by Ohio Carbon Co., 12508 Berea road, Cleveland, is applicable to a wide range



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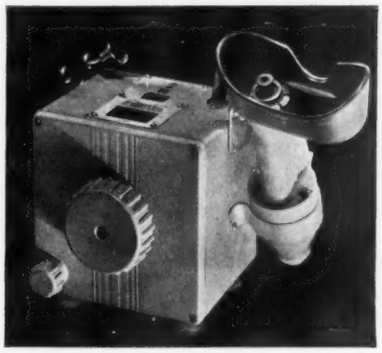
of electrical uses such as photo-electric safety and counting devices, motor-starters and relays, or for shop-testing uses, etc. Standard resistors are from 5 to 20 watts in a range of resistance values, all being guaranteed to plus or minus 5 per cent accuracy.

Compactness is obtained by use of axial terminal wires instead of usual projecting side-lugs. The elimination of end-bands otherwise necessary thus permits greater effective winding space. Core of specially developed porcelain has large radiating surface on inside and outside. After being wound, wire is covered with a baked-on ceramic coating to resist heat, moisture and vibration.

Optical Pyrometer

■ Leeds & Northrup Co., 4907 Stenton avenue, Philadelphia, announces a new industrial optical pyrometer using the potentiometer method and calibrated directly in temperature degrees. Both potentiometer and telescope are housed in strong, lightweight alloy castings and instrument weights only two-thirds as much as previous model. Eye-shield does not get hot, is flexible, fits the face and will spread to admit spectacles. Operator has only to sight telescope and adjust potentiometer. An emissivity compensating screen,



snapped into position by turning a ring, makes instrument direct-reading for molten steel temperatures. Image of object viewed appears erect and instrument can be focused on objects as close as 7 inches.

Objective lens is set deep in instrument to protect it from knocks and flying sparks. Scale, etched on a black background, is mounted on a drum. Scale length is 14 inches. Switch closes when hand grasps telescope and opens automatically when released. Pistol grip handle also is available. In forging operations the filament in the optical may be set to correspond to the lowest working temperature so that forge operator can tell when a piece is too cold. Since distance has no effect on the accuracy of measurement, operator can stand well away from the heat.

Gas Powered Carloader

■ A gas powered hydraulic-lift truck with a 47-inch wheel base for quicker maneuvering in railway freight cars and highway trucks is offered by Towmotor Co., 1226 East 152nd street, Cleveland. Machine has 2-wheel drive at load carrying end and 2-wheel steer at rear for making short pivot turns on either driving wheel. Two speeds forward and two speeds in reverse make possible speed of travel of ½ to 8 miles per hour in either direction. Braking surface of 150 square inches is provided. Lifting speeds can be varied from 40 to 60 feet per minute.

Motor is fully mounted on rubber, and transmission assembly is flexible and connected to drive axle by propellor shaft with two universal joints. Oil pump for hydraulic lift is connected to motor by constant drive to avoid clutching. Lifting capacity is 4000 pounds per load.

Variable-Voltage Planer Drive

■ A new variable-voltage drive for reversing planers announced by Gen-

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eral Electric Co., Schenectady, N. Y., is said to offer wide speed range, extremely fast acceleration and deceleration, high cutting efficiency, accuracy in stopping and a very simple system of control. Equipment gives independent selection of cut and return speeds throughout entire speed range, together with a maximum number of strokes per minute on all lengths of stroke.

Drive consists of a direct-connected planer drive motor and an independent motor-generator set. A maximum of nine contactors and relays constitute all operating devices on control panel. Table speeds up to 240 feet per minute can be obtained by using suitable gear ratios in planer. Tests have shown production increases ranging from 25 per cent up with this new drive on modern planers.

Folding Drawing Table

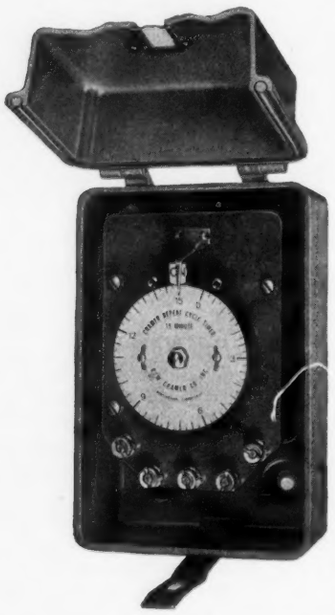
■ The "Handy" portable folding drawing table announced by Eugene Dietzgen Co., 2425 Sheffield avenue, Chicago, can be lifted easily with one hand and folds up and unfolds like a camp stool, setting almost automatically to the right drawing position. It is said to stand solid

and firm and not to shake when in use. Ample knee room and a pencil and instrument rack across the top are provided. The 20 x 26 pine drawing board is permanently attached to hardwood supporting frame.

Repeat Cycle Timer

■ R. W. Cramer Co. Inc., Centerbrook, Conn., announces a repeat cycle timer for use on alternating-current circuits to alternately close and open one or two circuits at any preset operating interval. Timer will also close or open a single circuit after any preset operating interval and stop, ready to repeat its cycle of operation upon reclosure of a starting switch.

Should any interruption in service



occur, these timers do not need to be reset but will resume operation. The timing motor will start on plus or minus 20 per cent of rated voltage and will stay in synchronism far

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beyond a satisfactory operating voltage for other equipment. The switch mechanism has a definite snap action with a positive lock in both operating positions.

Diamond Wheel Dresser

■ No. 155 diamond wheel dresser of Stanley Electric Tool division, New Britain, Conn., for Stanley contour grinder is said to provide an inexpensive means of truing and dressing grinding wheels or points. A ring on bottom of the dresser fits in counterbored hole on table top

of grinder. Knurled adjusting screw sets dresser. Diamond of ¼ to 1/3-carat is mounted in adjustable holder. A knurled screw sets diamond and regulates depth of cut. Motor holder of grinder can be adjusted from 90 to 45 degrees.

Decorating Spray Gun

■ Type AC spray gun of DeVilbiss Co., Toledo, O., supplies a range of service from the drawing of a fine pencil line to the laying of a broad soft spray and is said to bridge the gap between a large artist's air brush and the small production or touch-up spray gun. Especially suited to delicate tinting, fine stenciling, shading, blending and highlighting, this gun is intended for fine touch-up on automobiles, furniture and appliances.

Gun fits hand easily, permitting forefinger to rest naturally upon trigger to effect ready control. Three nozzle combinations adjustable for either round or fan spray applications, and having a maximum spray width of 3 inches are available.

System of Co-ordinated Process Control

■ The Bristol Co., Waterbury, Conn., announces its system of co-ordinated process control, an engineered combination of automatic control instruments and devices built in the form of a master control station. The system provides for co-ordinating and interlocking all the vital events of a process such as: time of operation of valves, pumps, blowers, electrical equipment, and the control at a definite value—or according to a time program—of such variables as: temperature, pressure, liquid level, flow, humidity, speed and chemical concentration.

This system is suitable for manufacture of chemical products and solvent recovery processes, where a series of timed operations must be controlled accurately and repeated identically—at the same time providing for the necessary flexible features required to vary the time periods when necessary.

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"Flash Baking" Oven

(*Concluded from Page 56*)

ing in a separating wall, the sheets enter the cooling section of the oven as shown in E of Fig. 1. Fresh air from the outside is blown into the cooling by jets G, Fig. 1, and then is piped to the oven entrance as described above. Although the sheets have been subjected for about a half minute to a temperature of 750 degrees Fahr. in the baking zone, they may be handled safely with gloves when discharged from oven at exit seen at extreme left of Fig. 4.

Protective Devices Installed

Protective devices ingeniously incorporated into the oven control air, gas and power supplies and are interlocked so that failure of any one or of the ventilating system will immediately shut off others and stop all operations. These controls are centralized on panel seen in Fig. 3.

Flame-extinguishing jets installed ahead of the oven entrance supplied with high-pressure air from the plant's main reservoir can release air with sufficient force to blow out any flames which may backfire from the oven interior should the induced draft ventilating system fail. These jets are controlled from the main exhaust stack by an air vane which is actuated when air pressure drops and operates in turn a solenoid valve to release air to the jets.

Failure to turn on air supply is guarded against by a manually operated valve with an extended stem which will hold closed a switch in the main power circuit only when the air valve is fully open. Should the air supply itself fail, a supplementary air-operated relay in the same power circuit cuts off power to the oven conveyor motor.

Additional safety devices on the oven include electrically operated relays to shut off all gas supply lines if any of the oven burners go out, complete overload protection for all motors and mercury trip switches for fans.

Combination Bin, Rack Reduce Handling

■ The combination of Stackbins and Stackracks made by Stackbin Corp., Providence, R. I., is claimed to improve parts storage and handling methods by eliminating the time-wasting transfer of small parts and materials from one container to another. With this combination, parts and materials are taken from one department to another in the same bins.

Stackbins, with full hopper fronts, designed for storage, production and assembly work, are stored in the stockroom in Stackracks, individual steel units which lock together to form storage racks of any desired shape or capacity. The Stackbins can be slid out of the Stackracks, carried to any part of the plant without removal or transfer of the contents, or any part of the contents can be removed from the Stackbins without disturbing the storage assembly such as piling and unpiling bins above wanted bin.

Rubber Conveyor Belt For Nine-Mile Haul

■ Goodyear Tire & Rubber Co., Akron, O., is fabricating approximately 20 miles of 36-inch rubber-covered belting for a conveyor system 9.6 miles long for Columbia Construction Co. Inc., Redding, Calif. The conveyor will be in 26 sections and will carry sand and rock aggregate from Redding to Shasta dam of the Central Valley project at Coram, Calif.

The belt will be supported on 12,500 steel troughing idlers and steel chutes will convey materials from one section to another at 25 transfer points. Motors of 200 horsepower each will move the belt, except that three sections with sharp downgrade will be self-operating and will develop power by operating generators.

The system is expected to convey 10,000,000 tons of material in the four years required for completion of the dam.

♦

Foxboro and Foxboro

■ Foxboro Co., Foxboro, Mass., manufacturer of industrial instruments for measurement and control, has issued a booklet entitled "Foxboro and Foxboro", the town and the company. It sketches the history of both, and presents it as an example of the integration of New England culture and modern manufacturing. The booklet is available to anyone interested by writing to the company at Foxboro.

To Mine Manganese Ore

■ Application for charter for the incorporation of the East Tennessee Manganese Co., authorized to issue $51,000 worth of preferred and common stock, was filed in the county register's office in Chattanooga, Tenn., Nov. 22, and the company announced its intention to begin operation of a manganese mine in Johnson county, Tennessee, that has been idle since the World war. The incorporators listed in the application are M. M. Allison Jr., J. K. Franklin and J. S. Millard. The office is at 611 Provident building, Chattanooga.

Completes Stainless Study

■ Iron alloys committee of Engineering foundation, New York, with the co-operation of Union Carbide & Carbon Research Laboratories Inc., Niagara Falls, has just completed a review and correlation of the research work of the world on stainless steels. The review which has been under way for several years will be published in 1940.

"HERCULES" RED-STRAND WIRE ROPE
REG. U.S. PAT. OFF.

You Can Depend On "Hercules" (Red Strand) Wire Rope

Highlights of Quality
1. Acid Open-Hearth Steel Wire
2. Rigid Tests and Inspections
3. Correct Manufacturing Methods
4. Furnished in both the Round and Flattened Strand constructions, in either Standard or Preformed Type.

• • *Results are what count, and the performance record of this wire rope continues to make and hold friends.*

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Advertisement

COPPER ALLOY BULLETIN

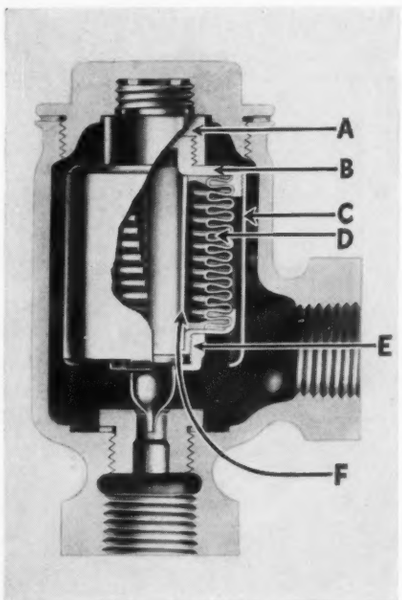
Reporting News and Technical Developments of Copper and Copper-Base Alloys

DECEMBER "Bridgeport" BRASS CO. 1939

STEAM TRAP PARTS SHOW ADAPTABILITY OF BRASS

The ease with which brass can be adapted to different fabricating processes for the production of a variety of shapes is admirably illustrated in the Thermo-Static Steam Traps manufactured by Sarco Company, Inc. These devices apply the principles of steam trapping to high pressure heating and industrial process work, and are used for pressures up to 200 pounds.

Part A in the photograph is made from round bar stock, B is pressed from sheet



metal, C and F are made from brass tubes. D is made from tubes and also from discs fabricated into tubes by Sarco. E is formed from hexagon bar stock.

Chromium Plating Method Produces Heavy Deposits

A new method for chromium plating is reported to be adapted for the production of heavy bright deposits. The method uses an aqueous solution containing about 250 grams of chromic acid and 1 to 5 grams of sulphate per liter. A current is passed to the article to be plated (which forms the cathode) at a density of at least 2 amperes per square inch. Temperature of the bath is maintained between 40 and 90 degrees C.

SPRING QUALITIES OF PHOSPHOR BRONZE GIVE WIDE ENGINEERING USEFULNESS

Strength, Ductility, Conductivity, and Corrosion Resistance Are Other Factors in Its Extensive Use in Many Applications

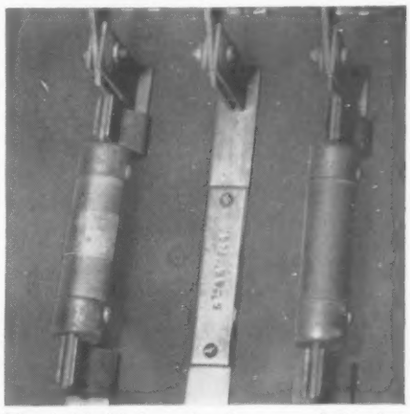
Notable among the copper alloys for its unique combination of desirable engineering properties, phosphor bronze is recognized as the most satisfactory alloy for many specialized applications.

The phosphor bronzes are alloys of copper and tin with small amounts of phosphorus. Two different compositions are given in the A.S.T.M. Specifications. The first is Phosphor Bronze A, containing 5% tin and 0.05 to 0.10% phosphorus, with the remainder copper. Phosphor Bronze C contains 8% tin, with the same amount of phosphorus as the A alloy. The phosphorus serves as a deoxidizing agent, just as it does in deoxidized copper, but it also increases the tensile strength.

Used for Spring Parts

The manufacture of spring parts is one of the outstanding applications of phosphor bronze. Here its high elasticity and resistance to fatigue under repeated bending are invaluable. Since phosphor bronze also has fair electrical conductivity, it is extensively used in switch and contactor parts, and fuse clips. Thermostatic bellows are another important use.

Other applications of phosphor bronze are the result of its high tensile strength, ductility, and resistance to corrosion by



The electrical industry is a large user of phosphor bronze. Spring qualities make this alloy especially suitable for such parts as fuse clips and spring contacts.

atmospheric conditions, dampness, and salt and acid waters. Such applications include bushings and valve parts. Still another extensive use is in paper-making machinery.

(Continued on Following Page, Column 2)

Self-Cleaning Shower Head Makes Copious Use of Brass

Novel idea in shower heads is the patented self-cleaning feature of the Anystream Head, manufactured by Speakman Company, Wilmington, Del. The Anystream Head never stops up. The conventional holes for the spray are replaced by a set of plungers that give normal or needle

showers at the turn of a handle. A further turn of the handle gives a floor spray that quickly washes away all sediment.

For long life in this unique head, Speakman Company uses brass. Outer section of the head is cast. The plungers, lever handle, the clips holding plungers to face plate, and the screws holding the face plate to the head are all made from brass rod.

Acetate and Thiosulphate Bath Colors Brass Blue

A blue color can be obtained on brass by using a solution of sodium thiosulphate and lead acetate, it is reported. Suggested quantities are 124 grams of thiosulphate and 38 grams of acetate for each liter of solution. The thiosulphate and the acetate are dissolved separately, each in a half-liter of water, and the two solutions are mixed just before use. Temperature of the bath should be about 60 degrees C., it is reported. A yellow-gold color is produced first, and is followed by the blue in about one-half minute.

COPPER ALLOY BULLETIN

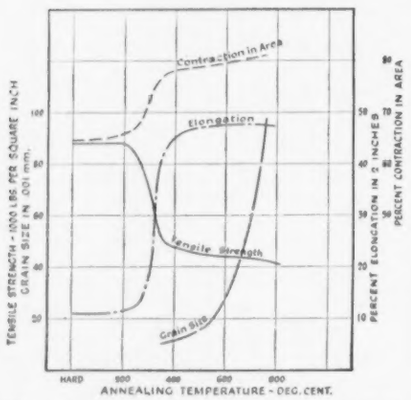
ALLOYS OF COPPER

This is the sixth of a series of articles on the properties and applications of the copper alloys, and continues the subject of Rich Low Brass.

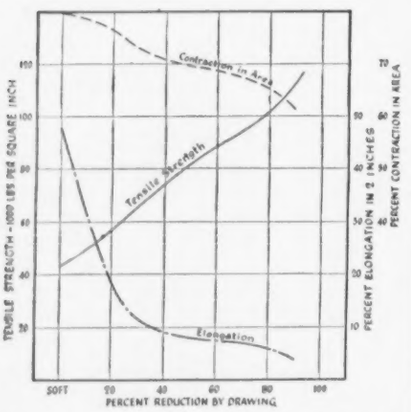
RICH LOW BRASS

The most important physical properties of Rich Low Brass (85-15) were listed in this column last month. Compared with Gilding Metal (95-5) or Commercial Bronze, Rich Low Brass is appreciably stronger and is hardened more rapidly by cold working. Other changes in properties, such as conductivity, coefficient of expansion, and density, vary more nearly in proportion to the increase in zinc content. Effects of cold working and annealing wire of this alloy are shown in the accompanying graphs.

The high strength and ductility of Rich Low Brass are accompanied by excellent resistance to failure by season cracking and dezincification. It is a combination of these properties that makes possible the use of this alloy in applications requiring the ability to withstand stresses without failure by deformation or corrosion.



Effect of Annealing on Mechanical Properties of 85-15 Copper-Zinc Alloys.



Effect of Cold Drawing on Mechanical Properties of 85-15 Copper-Zinc Alloys.

Wide Color Range Possible

The color of Rich Low Brass is also an important factor in its use. Alloys ranging between 82 and 88% copper show quite marked differences in color when the alloy is properly cleaned and polished. These slight differences in color have led to the use of several alloys of only slightly different copper content, depending upon the exact color desired. Most of such alloys find their use in the jewelry trade.

The alloy is also used to a considerable extent for water pipe and condenser tubes because of its resistance to dezincification and a slightly greater resistance to fatigue than high copper content alloys. Occasionally the alloy is modified slightly by the addition of small quantities of tin, in the belief that this increases the resistance to corrosion.

(The subject of Rich Low Brass will be concluded in next month's issue.)

Memos on Brass—No. 4

The composition of brass can be readily modified for specific requirements. The addition of lead, for example, results in a free-cutting alloy admirably adapted for high-speed automatic screw machine operation.

PHOSPHOR BRONZE USES

(Continued from Preceding Page, Column 3)

Bridgeport Brass Company, with its comprehensive manufacturing facilities, is in an excellent position to supply phosphor bronze of the high quality demanded by users of this versatile alloy. Its up-to-the-minute rolling equipment permits the use of larger bars for rolling sheet and strip. When these larger bars are used, the casting is sounder and more homogeneous—an especially important factor in the case of phosphor bronze. Bridgeport will be glad to discuss with prospective users the suitability of phosphor bronze for specific applications.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. Further information on any of them may be obtained by writing Bridgeport Brass Company, which will gladly refer readers to the manufacturer or other source.

A turret lathe of a new design is intended especially for brass work, according to the manufacturer. It has a 16¾-inch swing and is designed for high-speed operation. It is provided with a direct two-speed drive, and is said to feature automatic control of the two spindle speeds and the reverse, which are operated by the movement and indexing of the hexagon turret.

A brightening agent is said to be suitable for addition to any standard nickel solution in order to produce a bright, lustrous deposit. It is said to work equally well in conveyors, plating barrels, or steel tanks. Brightness of the deposit is used as an indication of need for periodic additions of the brightener.

A rack coating is reported to air-dry much faster than the usual coatings. Dipping speed is about five times as fast, it is said. Coating is of low viscosity, producing thin coatings. According to the manufacturer, no tape or special treatment is needed for applying the coating.

A spray tank is especially designed for rinsing racked parts in electroplating. Alternate spray streams circulate both clockwise and counter-clockwise, and are interrupted by straight line streams to produce a multiplicity of spray eddies, it is reported. The maker claims that the method allows water savings ranging from 38 to 86 per cent and time savings up to 65 per cent.

A solder pot is designed for dipping small and delicate parts. Inside dimensions of unit are 2¾ by ½ by ⅜ inch deep. Solder capacity is said to be 2¾ ounces.

A tapping machine is air-controlled and has a capacity up to ⅜-inch diameter in brass. An automatic valve is said to control the speed with which the tap is fed into the work and reversed. Foot pedal starts and stops the tapping cycle, which is then controlled by the automatic valve.

A heavy-duty blowpipe is said to be designed for welding and heating ranges above those which can be handled by ordinary blowpipes. It is said to deliver intense heat to a localized area.

A new electrode is said to produce successful welds in non-ferrous metals. It consists of a tube threaded or tapered at bottom to take a standard welding tip, and a light inner tube of flexible copper braid, with provision for water-cooling attachments. It is reported that only the welding tip, the inner tube, and the water-cooling attachments are movable. This arrangement, says the maker, decreases the mass and friction of the moving part, and permits much more rapid movement of the electrode.

PRODUCTS OF THE BRIDGEPORT BRASS COMPANY

Executive Offices: BRIDGEPORT, CONN.—Branch Offices and Warehouses in Principal Cities

SHEETS, ROLLS, STRIPS—*Brass, bronze, copper, Duronze,** for stamping, deep drawing, forming and spinning.

CONDENSER, HEAT EXCHANGER, SUGAR TUBES—For steam surface condensers, heat exchangers; oil refineries, and process industries.

PHONO-ELECTRIC* ALLOYS—High-strength bronze trolley, messenger wire and cable.

WELDING ROD—For repairing cast iron and steel, fabricating silicon bronze tanks.

LEDRITE* ROD—For making automatic screw machine products.

BRASS "Bridgeport" CO.

Established 1865

COPPER WATER TUBE AND FITTINGS—For plumbing, heating, underground piping.

DURONZE ALLOYS—High-strength silicon bronzes for corrosion-resistant connectors, marine hardware; *hot rolled sheets* for tanks, boilers, heaters, flues, ducts, flashings.

BRASS, BRONZE, DURONZE WIRE—For cap and machine screws, wood screws, rivets, bolts, nuts.

FABRICATING SERVICE DEPT.—Engineering staff, special equipment for making parts or complete items.

BRASS AND COPPER PIPE—"Plumrite"* for plumbing, underground and industrial services.

*Trade-name.

BRIDGEPORT BRASS

Demand Maintained In Price Extension

Ingot Production Rises to New Peak; Scrap Off Further

MARKET IN TABLOID ★

Demand

Leveling off but still heavy.

Prices

Reaffirmed on most products for next quarter.

Production

Up ½-point to 94 per cent.

■ REAFFIRMATION of prices on most steel products for next quarter delivery has had little effect on demand for either current or future shipment.

In some districts new business has tended to moderate, but this is not attributable entirely to the price announcements, since this factor already had been discounted. Bookings in other areas are equaling or exceeding shipments which are close to mill capacity. Backlogs generally are moderating slowly, if at all.

With unfilled business extending as much as 12 weeks in some products, operations are receiving strong support. Ingot output last week increased ½-point to 94 per cent and apparently will hold near this peak into the new year. In only a few instances are buyers seeking to defer shipments because of unchanged prices next quarter, and urgent requirements in other directions easily absorb this slack.

Price revisions are minor. An advance of $2 a ton in the hot-rolled sheet base partly is offset by a like reduction in certain extras on several sizes. The hot-rolled strip base also has been raised $2. Wire rods, recently priced per gross ton, will be priced per 100 pounds for delivery after Dec. 31. This adjustment results in only a small net change in the price.

Unchanged pig iron prices are indicated for next quarter, although silvery iron has been advanced $1 a ton, effective immediately.

Preliminary reports on November pig iron production indicate an all-time high for that month of 3,726,021 tons, compared with 3,627,384 tons in October and 2,286,661 tons a year ago.

Automotive steel needs will be heavy this month, particularly in view of the reopening of Chrysler plants. December assemblies likely will be the highest in almost two and a half years. Production last week recovered sharply to a new high for the year to date at 93,638 units. This gain of more than 21,000 over the preceding holiday week reflected only partially the Chrysler resumption and will be extended further this week.

Steel releases from railroad shops and freight car builders are increasing as work progresses on large equipment orders placed in past weeks. However, little additional car business is actively pending, this pointing to some reduction in unfilled orders by next quarter. Rail backlogs remain substantial, but mills are expected to increase production of track material early next year.

The outlook in structural shape and concrete reinforcing bar markets is less favorable, inquiries continuing to decline. Some fabricators still have fairly large backlogs, but there is less urgency for structural shipments, and relatively prompt delivery is available. Mills still have sizable bookings of concrete bars.

With the passing of the peak in steel orders and with production adjusted to the increased rate of consumption, mills are more disposed to quote on export business, especially for January and subsequent delivery. Steel exports continued to increase in October, the total of 255,181 tons being 4 per cent larger than in September and more than 25 per cent ahead of a year ago. Including scrap, October exports were the largest so far this year.

There are indications the sharp advances previously made on steel export prices may tend to disappear as first quarter approaches. Reductions already have been made on some items, including bars and plates for delivery next period. According to reports from consumers in neutral European countries, Germany is selling steel at the low prices quoted before the war started and is making deliveries, even at a sacrifice to domestic interests.

Lake Superior iron ore shippers closed the season with a rush, the November movement of 5,472,605 tons soaring 269 per cent over last year's total to establish the highest mark for that month since 1917. Shipments to Dec. 1 were 45,066,175 tons, 134 per cent ahead of 1938 but 29 per cent less than in 1937.

Scrap continues in a bear market, prices being off sharply at Pittsburgh and generally weak in other districts. The composite slumped $1.17 last week to $18.33, bringing it back to the mid-September level.

Variations in district steelmaking continue small. Gains of 2 points each last week brought eastern Pennsylvania to 88 per cent, Youngstown to 92 and Cleveland to 90. Chicago slipped 1 point to 94, Buffalo was off 2 to 93 and Cincinnati was down 4½ to 80. Unchanged areas were Pittsburgh at 94, Wheeling at 93, Birmingham at 94, New England at 100, St. Louis at 81. Detroit was up 3 to 93.

COMPOSITE MARKET AVERAGES

	Dec. 2	Nov. 25	Nov. 18	One Month Ago Nov., 1939	Three Months Ago Sept., 1939	One Year Ago Dec., 1938	Five Years Ago Dec., 1934
Iron and Steel	$37.26	$37.42	$37.44	$37.50	$36.67	$36.36	$32.39
Finished Steel	56.10	55.90	55.90	55.90	55.60	56.50	54.00
Steelworks Scrap..	18.33	19.50	19.58	20.06	17.97	14.77	11.02

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Dec. 2, 1939	Nov. 1939	Sept. 1939	Dec. 1938
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.25c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.57
Iron bars, Terre Haute, Ind.	2.15	2.15	2.125	2.05
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15-2.40	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.00	2.00	2.15
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.20
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.00	2.00	2.00
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.40	2.45

Semifinished Material

Sheet bars, Pittsburgh, Chicago.	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	43.00	43.00	43.00	43.00

Pig Iron

	Dec. 2, 1939	Nov. 1939	Sept. 1939	Dec. 1938
Bessemer, del. Pittsburgh	$24.34	$24.34	$23.35	$22.34
Basic, Valley	22.50	22.50	21.50	20.50
Basic, eastern, del. Philadelphia	24.34	24.34	23.54	22.34
No. 2 foundry, Pittsburgh	24.21	24.21	23.20	22.21
No. 2 foundry, Chicago	23.00	23.00	23.00	22.20
Southern No. 2, Birmingham	19.38	19.38	18.58	17.38
Southern No. 2, del. Cincinnati	22.89	22.89	22.09	20.89
No. 2X, del. Phila. (differ. av.)	25.215	25.215	24.415	23.215
Malleable, Valley	23.00	23.00	22.00	21.00
Malleable, Chicago	23.00	23.00	23.00	22.50
Lake Sup., charcoal, del. Chicago	30.34	30.34	30.34	29.84
Gray forge, del. Pittsburgh	23.17	23.17	22.15	21.17
Ferromanganese, del. Pittsburgh	105.33	105.33	95.35	97.77

Scrap

Heavy melting steel, Pittsburgh	$19.00	$21.90	$18.75	$15.50
Heavy melt. steel, No. 2, E. Pa.	18.25	19.25	17.10	13.20
Heavy melting steel, Chicago	17.25	17.45	19.25	16.05
Rails for rolling, Chicago	20.25	20.50	21.90	19.65
Railroad steel specialties, Chicago	20.50	21.50	21.75	18.00

Coke

Connellsville, furnace, ovens	$4.75	$5.00	$3.75	$3.75
Connellsville, foundry, ovens	5.75	6.00	5.00	5.00
Chicago, by-product fdry., del.	10.50	11.25	10.50	10.50

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.10c
Chicago, Gary	2.10c
Cleveland	2.10c
Detroit, del.	2.20c
Buffalo	2.10c
Sparrows Point, Md.	2.10c
New York, del.	2.34c
Philadelphia, del.	2.27c
Granite City, Ill.	2.20c
Middletown, O.	2.10c
Youngstown, O.	2.10c
Birmingham	2.10c
Pacific Coast points	2.60c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast points	3.65c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.80c
Pacific Coast	4.50c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	24.00	35.00
Cold stp.	22.00	22.50	32.00	52.00

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c-2.54c
Philadelphia, del.	2.15c-2.40c
Boston, delivered	2.46c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, Pa.	2.35c
Sparrows Point, Md.	2.10c
Claymont, Del.	2.10c-2.35c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Pittsburgh	3.35c
Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 20 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.49c
Gulf ports	2.50c
Pacific Coast points	2.75c

Rail Steel

(Base, 5 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Detroit, delivered	2.25c
Cleveland	2.15c

Buffalo	2.15c
Birmingham	2.15c
Gulf ports	2.50c
Pacific Coast points	2.75c

Iron

Chicago, Terre Haute	2.15c
Philadelphia	2.37c
Pittsburgh, refined	3.50-8.00c

Reinforcing

*New Billet Bars, Base**

Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt., Pitts.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

*Rail Steel Bars, Base**

Pittsburgh, Gary Chicago, Buffalo, Cleveland, Birm.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

**Subject to a deduction of 25 cents per 100 lbs. in lots of 20 tons or over of one size, in lengths of 30 feet or over, for shipment at one time to one destination.*

Wire Products

Pitts-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails	$2.55
(Per pound)	
Polished fence staples	2.55c
Galv. barbed wire, standard 12½ gage two-point hog, 80-rod spool $2.88; two-point cattle, 80-rod spool	$2.70
Annealed fence wire	2.90c
Galv. fence wire	3.30c
Woven wire fencing (base C. L. column)	67.00
Single loop bale tie, (base C. L. column)	56.00

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut Nails

Carload, Pittsburgh $3.70

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.65c	3.35c
Chicago	2.65c	3.35c
Gary, Ind.	2.65c	3.35c
Detroit	2.70c	*3.45c
Cleveland	2.65c	3.35c
Buffalo	2.65c	3.35c

* Delivered.

Alloy Bars (Hot)

(Base, 20 tons or over)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.70c

Detroit, delivered 2.80c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 0.55

4600 0.20 to 0.30 Mo. 1.50-2.00 Ni. 1.10

5100 0.80-1.10 Cr. 0.45

5100 Cr. spring flats 0.15

6100 bars 1.20

6100 spring flats 0.85

Cr. N., Van. 1.50

Carbon Van. 0.85

9200 spring flats 0.15

9200 spring rounds, squares 0.40

Electric furnace up 50 cents.

Strip and Hoops

(Base, hot strip, 1 ton or over; cold, 3 tons or over)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.10c
Detroit, del.	2.20c
Philadelphia, del.	2.42c
New York, del.	2.46c
Pacific Coast points	2.70c
Cooperage hoop, Youngs., Pitts.; Chicago, Birm.	2.20c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.80c
Chicago	2.90c
Detroit, del.	2.90c
Worcester, Mass.	3.00c

Carbon	Cleve., Pitts.
0.26—0.50	2.80c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass. $4 higher.

Commodity Cold-Rolled Strip	
Pitts.-Cleve.-Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.35c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00
Cents per pound	
Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, for full containers additional 10%.

Carriage and Machine

½ x 6 and smaller	68.5 off
Do. larger, to 1-in.	66 off
Do. 1⅛ and larger	64 off
Tire bolts	52.5 off

Stove Bolts

In packages with nuts separate 72.5 off; with nuts attached add 15%; bulk 83.5 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Plow bolts	68.5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
6-inch and less	67	70
⅞-1-inch	64	65
1⅛ and larger	62	62

Hexagon Cap Screws

Upset, 1-in., smaller ..... 70.0 off

Square Head Set Screws

Upset, 1-in., smaller	75.0 off
Headless set screws	64.0 off

Piling

Pitts., Chgo., Buffalo	2.40c
Gulf ports	2.85c
Pacific coast ports	2.90c

Rivets, Washers

Structural, Pittsburgh, Cleveland, Chicago	3.40c
⅞-inch and smaller, Pitts., Chi., Cleve.	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off	

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
½	63½	54
¾	66½	58
1—3	68½	60½

Iron

¾	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld		67½
2, lap weld		60
2½ to 3, lap weld		63
3½ to 6, lap weld		65
7 and 8, lap weld		64
10-inch lap weld		63½
12-inch, lap weld		62½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½"O.D.	13	$ 9.72	$23.71
1¾"O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼"O.D.	13	13.79	21.68
2¼"O.D.	12	15.16	.....
2½"O.D.	12	16.58	26.57
2¾"O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½"O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1 "O.D.	13	$ 7.82	$ 9.01
1¼"O.D.	13	9.26	10.67
1½"O.D.	13	10.23	11.79
1¾"O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2¼"O.D.	13	14.54	16.76
2¼"O.D.	12	16.01	18.45
2½"O.D.	12	17.54	20.21
2¾"O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½"O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½"O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$45.00-46.00
4-in., Birmingham	48.00-49.00
4-in., Chicago	56.80-57.80
6-in. & over, Chicago	53.80-54.80
6-in. & over, east fdy.	49.00
Do., 4-in.	52.00

Class A Pipe $3 over Class B Stnd. ftgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young., Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅜-inch incl.	43.00
Do., over ⅜ to 47/64-in. incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$4.75- 5.25
Connellsville, fdry.	5.50- 6.00
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.50- 6.50
Wise county fur.	5.00- 5.25

By-Product Foundry

Newark, N. J., del.	11.38-11.85
Chicago, outside del.	10.50
Chicago, delivered	11.25
Terre Haute, del.	10.75
Milwaukee, ovens	11.25
New England, del.	12.50
St. Louis, del.	11.75
Birmingham, ovens	7.50
Indianapolis, del.	10.75
Cincinnati, del.	10.50
Cleveland, del.	11.05
Buffalo, del.	11.25
Detroit, del.	11.00
Philadelphia, del.	11.15

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (less than 1000 lbs.)	14.75c
Do. (1000 lbs. or over)	13.75c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	6.75c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$28.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$24.00	$24.50	$23.50	$25.00
Birdsboro, Pa.	24.00	24.50	23.50	25.00
Birmingham, Ala.‡	19.38	.....	18.38	24.00
Buffalo	23.00	23.50	22.00	24.00
Chicago	23.00	23.00	22.50	23.50
Cleveland	23.00	23.00	22.50	23.50
Detroit	23.00	23.00	22.50	23.50
Duluth	23.50	23.50	.....	24.00
Erie, Pa.	23.00	23.50	22.50	24.00
Everett, Mass.	24.00	24.50	23.50	25.00
Granite City, Ill.	23.00	23.00	22.50	23.50
Hamilton, O.	23.00	23.00	22.50	.....
Neville Island, Pa.	23.00	23.00	22.50	23.50
Provo, Utah	21.00	.....	.....	.....
Sharpsville, Pa.	23.00	23.00	22.50	23.50
Sparrow's Point, Md.	24.00	.....	23.50	.....
Swedeland, Pa.	24.00	24.50	23.50	25.00
Toledo, O.	23.00	23.00	22.50	23.50
Youngstown, O.	23.00	23.00	22.50	23.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	24.39	24.39	23.89	24.89
Baltimore from Birmingham	24.78	.....	23.66	.....
Boston from Birmingham	24.12	.....	.....	.....
Boston from Everett, Mass.	24.50	25.00	24.00	25.50
Boston from Buffalo	24.50	25.00	24.00	25.50
Brooklyn, N. Y., from Bethlehem	26.50	27.00	.....	.....
Canton, O., from Cleveland	24.39	24.39	23.89	24.89
Chicago from Birmingham	†23.22	.....	.....	.....
Cincinnati from Hamilton, O.	23.24	24.11	23.61	.....
Cincinnati from Birmingham	23.06	.....	22.06	.....
Cleveland from Birmingham	23.32	.....	22.82	.....
Mansfield, O., from Toledo, O.	24.94	24.94	24.44	24.44
Milwaukee from Chicago	24.10	24.10	23.60	24.60
Muskegon, Mich., from Chicago, Toledo or Detroit	26.19	26.19	25.69	26.69
Newark, N. J., from Birmingham	25.15	.....	.....	.....
Newark, N. J., from Bethlehem	25.53	26.03	.....	.....
Philadelphia from Birmingham	24.46	.....	23.96	.....
Philadelphia from Swedeland, Pa.	24.84	25.34	24.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	25.45	25.45	24.95	24.95

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	23.50	23.50	23.00	....
St. Louis from Birmingham	†23.12	....	22.62	....
St. Paul from Duluth	25.63	25.63	....	26.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $28.50, base; $29.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$22.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	22.50	do., del. Chicago	30.34
		Lyles, Tenn.	26.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $28.50; 6.51-7—$29.00; 7-7.50—$29.50; 7.51-8—$30.00; 8-8.50—$30.50; 8.51-9—$31.00; 9-9.50—$31.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickset magnesite grains, f.o.b. Chewelah, Wash., net, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar

Washed gravel, duty pd., tide, net ton	$26.00-$27.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail.	22.00
Do. barge	22.00
No. 2 lump	22.00

Ferroalloy Prices

Ferromanganese, 78-82%, tide., duty pd. ...$100-110.00
Do., del. Pitts., ..105.33-115.33

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot.. 32.00
Do., 26-28% 39.50

Ferrosilicon, 50% freight allowed, c.l. 69.50
Do., ton lot 80.50
Do., 75 per cent..... 126.00
Spot, $5 a ton higher.

Silicomanganese, 2½ c. 103.00 2% carbon, 108.00; 1%, 118.00
Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 2.00-2.10

Ferrovanadium, 35 to 40%, lb., cont..2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 10.50c
Do., ton lots 11.25c
Do., less-ton lots 11.50c
67-72% carloads, 2% carbon, per lb. contained chrome 16.50c
Do., ton lots 17.25c
Do., less-ton lots 17.75c

	Carloads	Ton lots	Less ton
2% carb...	16.50c	17.25c	17.75c
1% carb...	17.50c	18.25c	18.75c
0.10% carb.	19.50c	20.25c	20.75c
0.20% carb.	18.50c	19.25c	19.75c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots... $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb..... 1.35
Do, less-ton lots..... 1.40
Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls... $2.25
Do., less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill.... 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton..$142.50
Do, spot 145.00
Do, contract, ton lots 145.00
Do, spot, ton lots.... 150.00
15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do, spot 160.00
Do, contract, ton lots. 160.00
Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, any quantity, freight allowed, lb. .. 7.25c
Do, spot carlots, bulk 7.50c
Do, ton lots 8.00c
Do., less-ton lots..... 8.25c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.50
Do., smaller lots 2.60

Vanadium Pentoxide, contract, lb. contained $1.10
Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c
Do, spot 85.00c
88% chrome, contract... 79.00c
Do, spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.00c
Do., 2% 12.50c
Spot ¼c higher

Silicon Briquets, contract carloads freight allowed, ton $69.50
Carload, spot 74.50
Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, bulk freight allowed, lb. 5.00c
Ton lots 5.50c
Less-ton lots 5.75c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, gross ton $97.50
Do, spot 102.50

34-40%, contract, carloads, lb., alloy 14.00c
Do, ton lots 15.00c
Do, less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do, 100-200 lb. lots.. 2.75
Do, under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: SAE 2300	Cold Drawn Bars: SAE 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.78	4.86	3.46	4.13	8.63	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.23	3.51	4.09	8.59	7.19
Philadelphia	3.85	3.85	4.35	3.55	3.55	5.25	3.55	4.55	4.93	3.51	4.06	8.56	7.16
Baltimore	3.95	4.05	4.45	3.70	3.70	5.25	3.55	....	5.05	....	4.05	....	....
Norfolk, Va.	4.15	4.25	....	3.90	3.90	5.45	3.75	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	6.40	4.20	4.40	4.50	3.42	3.75	8.15	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.75	3.35	3.65	8.35	6.95
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.72	3.20	3.75	8.15	6.75
Detroit	3.58	3.68	3.68	3.75	3.80	5.42	3.43	4.50	4.84	3.40	3.80	8.45	7.05
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.37	4.67	3.45	4.00	8.50	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.35	4.30	4.85	3.50	3.75	8.15	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.30	3.60	4.95	5.00	3.83	4.34	8.84	7.44
Milwaukee	3.63	3.73	3.73	3.68	3.68	5.28	3.48	4.43	4.98	3.54	3.88	8.38	6.98
St. Louis	3.62	3.72	3.72	3.47	3.47	5.07	3.38	4.32	4.52	3.61	4.02	8.52	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Memphis	3.90	4.00	4.00	3.95	3.95	5.71	3.75	....	5.00	....	4.31	....	....
Chattanooga	3.80	3.90	3.90	3.85	3.85	5.68	3.65	....	4.40	....	4.39	....	....
Tulsa, Okla.	4.44	4.54	4.54	4.33	4.33	5.93	4.24	....	5.19	....	4.69	....	....
Birmingham	3.50	3.60	3.60	3.55	3.55	5.88	3.35	....	4.85	..	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	4.05	6.20	6.20	4.05	4.05	5.75	4.20	....	5.25	....	..	....	....
*Seattle	4.00	3.85	5.20	3.40	3.50	5.75	3.70	6.50	4.75	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	4.75	....	5.75	....	....
Los Angeles	4.15	4.65	6.35	4.00	4.00	6.40	3.75	6.50	5.15	....	6.15	10.65	9.80
San Francisco	4.00	4.35	6.00	4.00	4.00	5.60	3.75	6.40	5.15	....	6.80	10.65	9.80

	SAE Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.18	7.50	6.05	5.80	7.90
New York (Met.)	4.04	7.35	5.90	5.65	....
Philadelphia	4.10	7.31	5.86	5.61	8.56
Baltimore	4.10	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.10	5.65	5.40	7.50
Pittsburgh	3.40	7.35	5.95	5.50	7.60
Cleveland	3.30	7.30	5.85	5.85	7.70
Detroit	3.63	7.42	5.97	5.72	7.19
Cincinnati	3.65	7.44	5.99	5.74	7.84
Chicago	3.70	7.10	5.65	5.40	7.50
Twin Cities	3.95	7.45	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.82	7.47	6.02	5.77	7.87
Seattle	5.85	....	8.00	7.85	8.65
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.40	8.55	8.40	9.05
San Francisco	5.00	9.65	8.80	8.65	9.30

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds, except 0-1999 pounds (hot rolled sheets only) in New York; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland, Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Kansas City and St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 300-4999 in San Francisco, Portland; any quantity in Twin Cities; 300-1999 in Los Angeles.

Galvanized Sheets: Base, 0-1499 pounds in New York, Tulsa; 150-1499 pounds in Cleveland, Milwaukee, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle, San Francisco; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, St. Louis; 1500 and over in Chattanooga, Philadelphia; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 or 2000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, Nov. 30

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports	£ s d	Quoted in dollars at current value	Continental Channel or North Sea ports, gross tons **Quoted in gold pounds sterling	£ s d
Foundry, 2.50-3.00 Si.	$19.45	5 0 0	$29.82		3 10 0
Basic bessemer	....	....	19.59		2 6 0
Hematite, Phos. .03-.05	20 42	5 5 0	....		....
Billets	$28.69	7 7 6	$31.95		3 15 0
Wire rods, No. 5 gage	44.25	11 7 6	57.51		6 15 0
Standard rails	$36.96	9 10 0	$48.99		5 15 0
Merchant bars	2.13c	12 5 0	2.66c		7 0 0
Structural shapes	1.94c	11 2 6	2.57c		6 15 0
Plates, †¾ in. or 5 mm.	1.90c	10 18 9	3.71c		9 15 0
Sheets, black, 24 gage or 0.5 mm.	2.72c	15 12 6	3.71c		9 15 0°
Sheets, gal., 24 ga., corr.	3.15c	18 2 6	4.66c		12 5 0
Bands and strips	2.13c	12 5 0	2.74c		7 4 0
Plain wire, base	3.39c	19 10 0	3.04c		8 0 0
Galvanized wire, base	4.05c	23 5 0	3.61c to 3.66c		9 10 0 to 9 12 6
Wire nails, base	....	....	3.52c		9 5 0
Tin plate, box 108 lbs.	$ 6.13	1 1 6	....		....

British ferromanganese $100.00 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French Francs		Belgian Francs		Reich §§Mark
Fdy. pig iron, Si. 2.5	$21.00	5 8 0(a)	$14.94	679.30	$23.10	700	$25.33	63
Basic bess. pig iron	19.74	5 1 6(a)	....	....	....	....	27.94	(b)69.50
Furnace coke	5.69	1 9 2	4.95	225	7.43	225	7.64	19
Billets	33.58	8 7 6	22.64	1,029	28.38	860	38.79	96.50
Standard rails	1.77c	10 3 0	1.41c	1,405	2.06c	1,375	2.38c	132
Merchant bars	2.23c	12 16 0††	1.30c	1,304	1.88c	1,250	1.98c	110
Structural shapes	1.98c	11 8 0††	1.27c	1,268	1.88c	1,250	1.93c	107
Plates, †¾-in. or 5 mm.	2.00c	11 10 6††	1.65c	1,650	2.21c	1,475	2.29c	127
Sheets, black	2.81c	16 2 6§	1.96c	1,958‡	2.63c	1,750‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.24c	18 12 6	2.85c	2,850	4.05c	2,700	6.66c	370
Plain wire	3.13c	18 0 0	2.00c	2,000	2.48c	1,650	3.11c	173
Bands and strips	2.36c	13 11 0††	1.44c	1,444	1.95c	1,300	2.29c	127

†British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling not quoted. §§Last prices, no current quotations.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; †indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	17.00
Bos. dock No. 1 exp.	17.00-17.50
New Eng. del. No. 1	17.25-17.50
Buffalo, No. 1	19.00-19.50
Buffalo, No. 2	17.00-17.50
Chicago, No. 1	17.00-17.50
Chicago, auto, no alloy	16.00-16.50
Chicago, No. 2 auto	14.00-14.50
Cincinnati dealers	15.00-15.50
Cleveland, No. 1	18.50-19.00
Cleveland, No. 2	17.50-18.00
Detroit, No. 1	†14.00-14.50
Detroit, No. 2	†13.00-13.50
Eastern Pa., No. 1	19.00-19.50
Eastern Pa., No. 2	18.00-18.50
Federal, Ill.	15.00-15.50
Granite City, R. R.	16.00-16.50
Granite City, No. 2	15.00-15.50
Los Angeles, No. 1	17.00-17.50
Los Angeles, No. 2	16.00-16.50
L. A., No. 1 f.a.s.	18.50-19.50
L. A., No. 2 f.a.s	17.50-18.50
N. Y. dock No. 1 exp.	17.50
Pitts., No. 1 (R. R.)	20.50-21.00
Pittsburgh, No. 1	18.50-19.50
Pittsburgh, No. 2	17.50-18.00
St. Louis, R. R.	16.50-17.00
St. Louis, No. 2	15.00-15.50
San Francisco, No. 1	17.00-17.50
San Francisco, No. 2	16.00-16.50
Seattle, No. 1	14.50-15.50
Toronto, dlrs., No. 1	11.25
Valleys, No. 1	19.00-19.50

COMPRESSED SHEETS

Buffalo, new	17.00-17.50
Chicago, factory	16.50-17.00
Chicago, dealers	15.00-15.50
Cincinnati, dealers	14.00-14.50
Cleveland	18.00-18.50
Detroit	†15.00-15.50
E. Pa., new mat.	19.00-19.50
E. Pa., old mat.	17.50
Los Angeles	12.00-12.50
Pittsburgh	18.50-19.50
St. Louis	12.50-13.00
San Francisco	14.00-14.50
Valleys	18.50-19.00

BUNDLED SHEETS

Buffalo, No. 1	17.00-17.50
Buffalo, No. 2	17.00-17.50
Cleveland	14.00-14.50
Pittsburgh	17.50-18.00
St. Louis	10.50-11.00
Toronto, dealers	9.75

SHEET CLIPPINGS, LOOSE

Chicago	11.50-12.00
Cincinnati dealers	10.00-10.50
Detroit	†10.00-10.50
St. Louis	10.00-10.50
Toronto, dealers	6.75- 7.00

BUSHELING

Buffalo, No. 1	17.00-17.50
Chicago, No. 1	16.00-16.50
Cincin., No. 1, deal.	11.50-12.00
Cincinnati, No. 2	5.00- 5.50
Cleveland, No. 2	12.00-12.50
Detroit, No. 1, new	†14.00-14.50
Valleys, new, No. 1.	18.50-19.00
Toronto, dealers	5.00- 5.50

MACHINE TURNINGS (Long)

Birmingham	7.50
Buffalo	11.00-11.50
Chicago	10.00-10.50
Cincinnati, dealers	6.50- 7.00
Cleveland, no alloy	11.00-11.50
Detroit	†8.50- 9.00
Eastern Pa.	13.50
Los Angeles	4.00- 5.00
New York	†8.00- 8.50
Pittsburgh	13.00-13.50
St. Louis	7.00- 7.50
San Francisco	5.00
Toronto, delaers	6.00- 6.25
Valleys	11.00-11.50

SHOVELING TURNINGS

Buffalo	13.50-14.00
Cleveland	12.50-13.00
Chicago	10.50-11.00
Chicago, spcl, anal.	12.50-13.00
Detroit	†11.00-11.50
Pitts., alloy-free	15.00-15.50

BORINGS AND TURNINGS
For Blast Furnace Use

Boston district	†5.50- 6.00
Buffalo	11.00-11.50
Cincinnati, dealers	5.50- 6.00
Cleveland	12.00-13.00
Eastern Pa.	12.50-13.00
Detroit	†8.00- 8.50
New York	†8.00- 8.50
Pittsburgh	12.50-13.00
Toronto, dealers	5.50- 6.00

AXLE TURNINGS

Buffalo	17.00-17.50
Boston district	†10.50-11.00
Chicago, elec. fur.	17.50-18.00
East. Pa. elec. fur.	16.50-17.00
St. Louis	13.50-14.00
Toronto	6.00- 6.50

CAST IRON BORINGS

Birmingham	7.00- 7.50
Boston dist. chem.	†9.50- 9.75
Buffalo	11.00-11.50
Chicago	9.00- 9.50
Cincinnati, dealers	5.50- 6.00
Cleveland	12.00-13.00
Detroit	†8.00- 8.50
E. Pa., chemical	14.50-15.00
New York	†8.00- 8.50
St. Louis	6.50- 7.00
Toronto, dealers	5.50- 5.75

RAILROAD SPECIALTIES

Chicago	20.25-20.75

ANGLE BARS—STEEL

Chicago	19.00-19.50
St. Louis	18.00-18.50

SPRINGS

Buffalo	21.50-22.00
Chicago, coil	20.00-20.50
Chicago, leaf	19.50-20.00
Eastern Pa.	24.00
Pittsburgh	24.00-24.50
St. Louis	19.00-19.50

STEEL RAILS, SHORT

Birmingham	12.00-12.50
Buffalo	22.00-22.50
Chicago (3 ft.)	19.50-20.00
Chicago (2 ft.)	20.00-20.50
Cincinnati, dealers	20.50-21.00
Detroit	†21.50-22.00
Pitts., 3 ft. and less	24.00-24.50
St. Louis, 2 ft & less	21.00-21.50

STEEL RAILS, SCRAP

Boston district	†15.50-16.00
Buffalo	21.00-21.50
Chicago	17.50-18.00
Cleveland	22.00-22.50
Pittsburgh	21.50-22.00
St. Louis	18.00-18.50
Seattle	18.00-18.50

FROGS, SWITCHES

Chicago	17.00-17.50
St. Louis, cut	18.00-18.50

ARCH BARS, TRANSOMS

St. Louis	18.00-18.50

PIPE AND FLUES

Chicago, net	12.00-12.50
Cincinnati, dealers	11.00-11.50

RAILROAD GRATE BARS

Buffalo	12.00-12.50
Chicago, net	11.00-11.50
Cincinnati, dealers	9.00- 9.50
Eastern Pa.	16.00-16.50
New York	†12.50-13.00
St. Louis	13.00-13.50

RAILROAD WROUGHT

Birmingham	11.00-11.50
Boston district	†9.50-10.00
Eastern Pa., No. 1	20.00-20.50
St. Louis, No. 1	12.50-13.00
St. Louis, No. 2	16.00-16.50

FORGE FLASHINGS

Boston district	†11.75-12.00
Buffalo	17.00-17.50
Cleveland	17.50-18.00
Detroit	†13.50-14.00
Pittsburgh	17.50-18.00

FORGE SCRAP

Boston district	†7.00
Chicago, heavy	20.50-21.00

LOW PHOSPHORUS

Cleveland, crops	23.50-24.00
Eastern Pa., crops	24.00
Pitts., billet, bloom, slab crops	25.50-26.00

LOW PHOS. PUNCHINGS

Buffalo	20.00-20.50
Chicago	20.00-20.50
Cleveland	20.00-20.50
Eastern Pa.	24.00-25.00
Pittsburgh	23.50-24.00
Seattle	15.00
Detroit	†15.50-16.00

RAILS FOR ROLLING
3 feet and over

Birmingham	20.00
Boston	†17.00-17.50
Chicago	20.00-20.50
New York	†18.50-19.00
Eastern Pa.	23.50-24.00
St. Louis	19.50-20.00

STEEL CAR AXLES

Birmingham	20.00-21.00
Boston district	†18.50-19.00
Chicago, net	20.50-21.00
Eastern Pa.	24.50-25.00
St. Louis	22.00-22.50

LOCOMOTIVE TIRES

Chicago (cut)	20.00-20.50
St. Louis, No. 1	17.50-18.00

SHAFTING

Boston district	†18.50-18.75
New York	†18.00-18.50
Eastern Pa.	24.00
St. Louis, 1¼-3¾".	19.50-20.00

CAR WHEELS

Birmingham	13.50-14.00
Boston dist., iron	†14.00-14.25
Buffalo, steel	21.50-22.00
Chicago, iron	17.00-17.50
Chicago, rolled steel	19.50-20.00
Cincin., iron, deal.	17.50-18.00
Eastern Pa., iron	20.50-21.00
Eastern Pa., steel	24.00
Pittsburgh, iron	21.00-21.50
Pittsburgh, steel	24.00-24.50
St. Louis, iron	19.00-19.50
St. Louis, steel	19.50-20.00

NO. 1 CAST SCRAP

Birmingham	13.00-13.50
Boston, No. 1 mach.	†15.25-15.75
N. Eng. del. No. 2	17.00-17.50
N. Eng. del. textile	18.25-18.75
Buffalo, cupola	17.50-18.00
Buffalo, mach.	18.00-18.50
Chicago, agri. net	14.00-14.50
Chicago, auto net	15.00-15.50
Chicago, railroad net	14.50-15.00
Chicago, mach. net	15.00-15.50
Cincin., mach. deal.	16.50-17.00
Cleveland, mach.	20.00-21.00
Detroit, cupola, net	†15.50-16.00
Eastern Pa., cupola	21.50-22.00
E. Pa., mixed yard	18.00-18.50
Los Angeles	16.00-17.00
Pittsburgh, cupola	19.50-20.00
San Francisco	†12.00-13.00
Seattle	16.00-16.50
St. Louis, breakable	15.25-15.75
St. Louis agri. mach.	18.25-18.75
St. L., No. 1 mach.	18.00-18.50
San Francisco	16.00-17.00
Toronto, No. 1 mach., net, dealers	16.00-16.50

HEAVY CAST

Boston dist. break.	†13.50-13.75
New England, del.	15.50-16.00
Buffalo, break	15.00-15.50
Cleveland, break, net	15.25-15.75
Detroit, auto net	†16.50-17.00
Detroit, break.	†13.50-14.00
Eastern Pa.	18.50-19.00
Los Ang., auto, net.	14.50
New York, break	†15.00-15.50
Pittsburgh, break	16.00-16.50

STOVE PLATE

Birmingham	9.00-10.00
Boston district	†12.50
Buffalo	13.50-14.00
Chicago, net	10.50-11.00
Cincinnati, dealers	9.50-10.00
Detroit, net	†10.00-10.50
Eastern Pa.	16.00-16.50
New York, fdy.	13.00-13.50
St. Louis	12.00-12.50
Toronto dealers, net	11.00-11.50

MALLEABLE

Birmingham, R. R.	14.00-15.00
New England, del.	20.00-21.00
Buffalo	19.50-20.00
Chicago, R. R.	19.00-19.50
Cincin., agri., deal.	14.75-15.25
Cleveland, rail	22.50-23.00
Eastern Pa., R. R.	21.50-22.00
Los Angeles	12.50
Pittsburgh, rail	20.50-21.00
St. Louis, R. R.	18.00-18.50

Ores

Lake Superior Iron Ore

Gross ton, 51½ %
Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbessemer	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbessemer	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	9.00-10.00

Foreign Ore
(Prices nominal)

Cents per unit, c.i.f. Atlantic

Manganiferous ore, 45-55% Fe., 6-10% Mn.	14.00-15.00
North African low phos.	14.00
Spanish, No. African basic, 50 to 60%	14.00
Chinese wolframite, short ton unit, duty paid	$23.75-25.00
Scheelite, imp.	$25.00-26.00
Newfoundland fdry. 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$25.00-26.00

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52%	50.00-51.00
So. African, 50-52%	50.00-51.00
Indian, 49-50%	nom
Brazilian, 48-52%	50.00
Cuban, 50-51%, duty free	61.20

Molybdenum

Sulphide conc., per lb., Mo. cont., mines	$0.75

—The Market Week—

Most Quotations Are Reaffirmed

■ CURRENT base prices on most grades of finished and semifinished steel products have been reaffirmed for shipment to and including March 31, 1940, for delivery and consumption in the United States.

Taking the lead in this action was Carnegie-Illinois Steel Corp. which, last Tuesday, announced extension of prices on its various products, with the exception of hot-rolled sheets and strip, and tin plate. The corporation stated it was taking this move "in spite of rising costs and many uncertainties" and "desiring to co-operate in preventing inflationary tendencies."

Products affected include rerolling blooms, billets and slabs, sheet bars, forging blooms, billets and slabs, carbon and alloy bars, structural shapes, steel sheet piling, rails, plates, electrical sheets, vitrenamel and galvanized sheets, long terne sheets, black plate and cold-rolled sheets.

Base prices on hot-rolled sheets and strip were advanced $2 a ton for first quarter, but the sheet increase partly is offset by corresponding reductions in certain extras. On Friday, Carnegie-Illinois announced extension of prices on tin plate and manufacturing ternes.

Other producers have taken similar action, and makers of cold-drawn carbon and alloy bars have followed suit by reaffirmation of prices on these commodities.

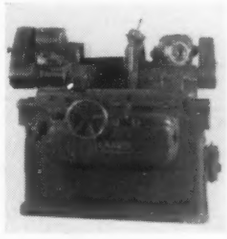
On Thursday, American Steel & Wire Co. reaffirmed base prices on low carbon basic and bessemer wire, cold-rolled strip and commodity strip for shipment through first quarter. Hot-rolled rods were adjusted from a per ton basis to a price per 100 pounds. The new quotations represent practically no change in coarse rods and a small increase on sizes No. 5 gage to 9/32-inch.

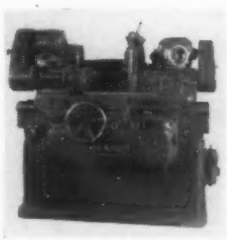
Silvery pig iron has been advanced $1 a ton, effective immediately. Most producers of other grades have taken no formal action regarding first quarter prices, but an extension is indicated.

Semifinished Steel

Semifinished Prices, Page 89

New York—Reports of a revival of a large British inquiry for semifinished steel, involving as much as 200,000 tons, are being questioned here by exporters, who claim that their investigations show no evidence of such a development. Short-





Picture of a Parasite...

The lowly toadstool is not unattractive—yet it is a parasite. Upon careful analysis its existence is difficult to justify. ¶ Toadstools of a kind will be found in many industrial plants today. For the most part they may not be unattractive for they are mechanically in good condition. Unless the situation is carefully analyzed they may seem to completely justify their existence. But do they? ¶ The toadstools we are referring to are obsolete machine tools; specifically, obsolete grinding machines. Even though they may be in perfect mechanical condition, the recent advances in design and productiveness have been so marked that the continued use of old equipment makes profits impossible in the face of competition. ¶ A well known valve manufacturer recently installed two Landis 6″ x 18″ Type C Plain Hydraulic Grinders. He found that they produced better work than he had gotten before, but more important, that his production was increased 100%. If he were still using his older machines, how could they be termed anything else but parasites? ¶ Investigate your own grinding department and make certain that every machine in it is contributing to, not eating, profits. 307

LANDIS TOOL COMPANY
WAYNESBORO, PENNA.

PRECISION LANDIS GRINDERS

INVEST IN LANDIS

ly after outbreak of the war a substantial tonnage was placed in this country, possibly totaling as high as 200,000 tons, but there has been no active interest in semifinished since then by belligerent countries, exporters declare.

Sheets, Strip

Sheet & Strip Prices, Pages 88, 89

Pittsburgh—Sheet and strip prices have been reaffirmed for delivery through next quarter, with the exception of minor changes on hot-rolled material. Base quotations on hot-rolled sheets and strip have been advanced $2 a ton to 2.10c, Pittsburgh.

In case of 17 and 18 gage sheets this increase has been offset by a like reduction in size extras, while the pickling extra on sheets 23 gage and lighter also has been lowered 10 cents per 100 pounds. New coiling extras of 10 cents per 100 pounds have been adopted on all cold-rolled material over 12 inches wide and on coils of hot-rolled, pickled and annealed sheets in 19, 20, 21 and 22 gages. Business has shown little effect from the price action. Quotations have not been a factor for some time, deliveries being the greatest problem. Resumption of Chrysler operations is intensifying automotive needs.

Cleveland—Minor adjustments in some prices and reaffirmation of others have been without major influence on demand, buyers continuing to call for sustained shipment. Little change has appeared in forward purchases. Revisions in base prices and certain extras establish a better relationship between hot-rolled pickled and annealed sheets and mill run cold-rolled material, in addition to closing the former spread between base prices of hot-rolled sheets and plates. Both are now 2.10c, Cleveland.

New York — While in some cases changes in hot sheet and strip prices are stimulating demand for delivery before Jan. 1, this pressure has been offset by an easing in releases in other quarters on grades on which prices have been extended. This tapering has also offset a slight pickup in demand from buyers who held up at least a portion of their future requirements pending a decision on next quarter prices. Specifications, however, are brisk as a whole, consumers still being unable to accumulate large stocks.

Philadelphia — Eastern mills are following price adjustments on sheets and strip. Heintz Mfg. Co. is increasing operations to three shifts daily, because of production of interior tanks, racks and other equipment for 329 tanks booked recently by American Car & Foundry Co. Heintz also will supply steel covers for Philco's low-priced air-conditioner assembled by York Ice Machinery Co., which may run 10,000 units next year. Other sheet consumers also are active.

Buffalo—Sheet and strip mills are maintaining near-capacity schedules, but an easier feeling is expected to develop now that first quarter prices have been announced. Thus far, however, sellers report no waning in demand has taken place.

Cincinnati—District sheet producers are following in the action taken with regard to first quarter prices by the leading interest. Forward buying recently has been less active, but additional interest is expected to result from the price announcement. Pressure to obtain delivery this quarter has not relaxed.

St. Louis—With the exception of a few interests, among them certain important warehouses, pressure for sheet deliveries has relaxed. Consumption continues on a large scale and well diversified, but mills are functioning better in deliveries and

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the recent congestion appears to have been somewhat relieved.

Plates

Plate Prices, Page 88

Pittsburgh — Plate prices have been reaffirmed for next quarter. This was generally expected. The market is less active, with industrial demand lighter, although some heavy orders for armor plate have been placed by the navy. Backlogs prevent acceptance of additional large orders for delivery the remainder of this quarter.

Cleveland—Plate deliveries again have backed up after an easier situation had existed for a short time, some mills now asking six weeks on new orders. Releases are sustained.

Chicago—Reaffirmation of plate prices is expected to have a beneficial effect on railroad equipment orders early next year. Plate orders generally are lighter but releases are supporting relatively heavy production.

Boston — Shipyard and railroad plate releases are steady with deliveries somewhat improved. New buying lags, with specified work lacking. Boiler and structural shops are placing little business. Most orders bring 2.35c, eastern Pennsylvania base.

Philadelphia—Several independent plate producers continue to quote 2.35c, base, for delivery this month, and additional business is being done on this basis. So far, no action has been taken on first quarter prices. Releases are holding up well but are slower in a few directions. The export market is easier, with 2.45c, f.a.s., on tank plates and 2.55c on ship plates more generally quoted.

Birmingham, Ala. — Birmingham and Gadsden mills report steady production of plates, a large part being for railroad car building at Bessemer. Some tonnage will be carried over to next quarter.

Seattle — Local shops have had inquiries for materials required in national defense but nothing definite has developed. No large projects are up for figures, present orders being confined to routine boiler, tank and smokestack jobs, each less than 100 tons. Lighthouse department, Portland, received bids Nov. 27 for fabricating three oil tanks, 3/16-inch plate. Youngstown Sheet & Tube Co. has been awarded 100 tons of sheets by Montana for automobile licenses.

San Francisco — Demand for plates continues quiet and the only award of the week went to Consolidated Steel Corp., 100 tons for a filtration plant at Los Angeles. Awards so far this year total 90,426 tons, compared with 40,082 tons for the corresponding period in 1938.

Plate Contracts Placed

100 tons, filtration plant, Los Angeles, to Consolidated Steel Corp., Los Angeles.

Unstated tonnage, 150,000-gallon elevated tank, Fort Screven, Ga., to R. D. Cole Mfg. Co., Newnan, Ga., $15,800, pro. 826-9.

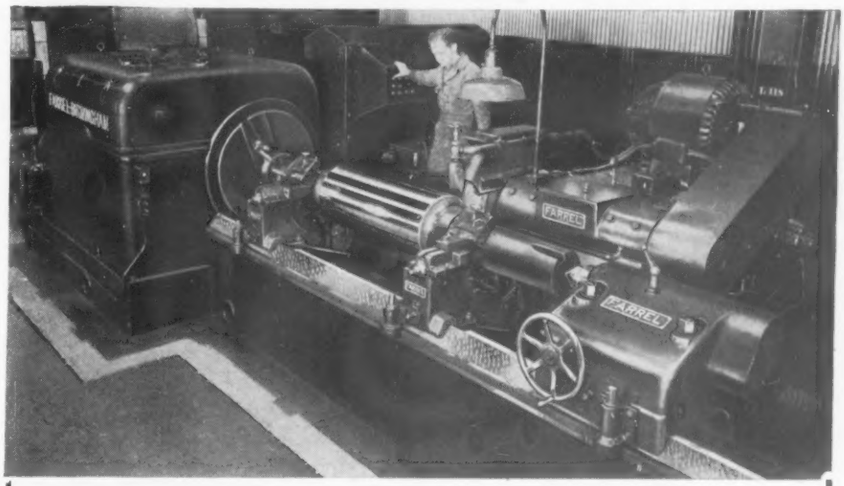
Plate Contracts Pending

Unstated tonnage, 100,000-gallon vertical fuel oil storage tank, Edgewood Arsenal, Md., pro. 324, bids Dec. 7.

Bars

Bar Prices, Page 88

Cleveland—Despite some letdown in buying, bar producers still encounter difficulty satisfying all buyers with current deliveries. Extension of prices generally was expect-



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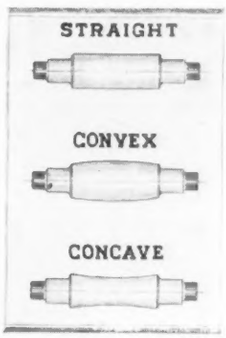

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When rolls are ground with the accuracy and finish obtained in a Farrel Heavy Duty Roll Grinder rolled metal strip and sheet with better quality surface and more accurate gauge is produced in the mill.

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ed, but mills already have accumulated large backlogs which will support near-capacity production through January.

Pittsburgh—Reaffirmation of current prices on hot-rolled carbon and alloy bars for first quarter delivery has been followed by similar action on cold-drawn material.

Chicago — Bar sales still are substantial, with bookings extending far into next quarter. No increase in buying has accompanied recent price announcements, however. Most prominent requirements are originating from the automotive industry, agricultural equipment makers, and railroad car shops, although miscellaneous interests continue to take proportionately heavy tonnage.

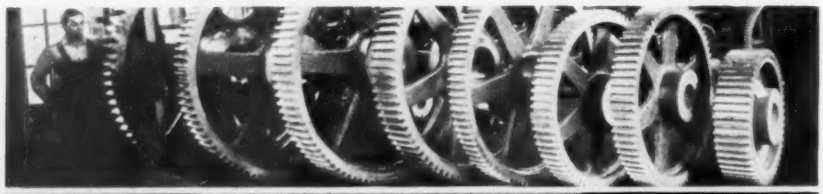
Boston — Demand for alloy steel bars is well maintained, machine, government and miscellaneous shop buying being active. Hot carbon bar buying has slackened slightly, but specifications are steady. Railroads are releasing more material.

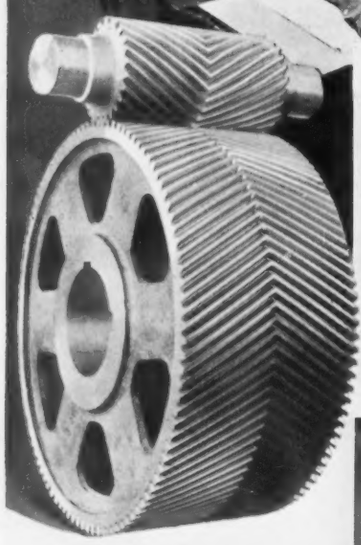
New York—Reaffirmation of current prices for next quarter on hot-rolled and cold-drawn carbon and alloy bars is expected to have little influence on specifications. Demand currently is brisk. Some bolt and nut makers are pressing for tonnage to meet immediate needs, and releases from freight car builders have increased markedly.

Philadelphia—Mill deliveries continue extended, averaging six to eight weeks. No weakness is noted in rerolled bars. Consumption is heavy, with small equipment builders especially busy, including makers of auxiliary equipment for ships.

Birmingham, Ala. — Mills report continued demand for bars, especially merchant and concrete reinforcing, with considerable going to manufacturers of agricultural implements.

Buffalo—Some bar producers are starting to cut in on heavy backlogs as a tapering is noted in releases from certain automotive interests. Unfilled orders still are sufficient to keep mills at capacity through December. Reaffirmation of prices is expected to see some letup in pressure for prompt delivery.





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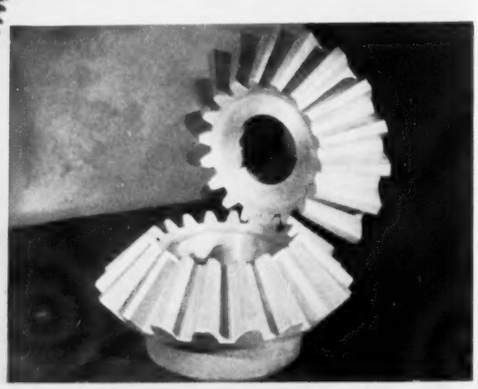

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Pipe

Pipe Prices, Page 89

Boston — Pressure for cast iron pipe deliveries has eased, with foundry stocks of small diameters better balanced. Most municipalities have taken full shipments against annual contracts and in some instances increased original estimates. Utilities are not active. Merchant steel pipe buying is in small lots and slightly slower. Wrought pipe demand is light.

New York — Alco Products Inc., this city, has booked 2310 tons of steel pipe for the department of water supply, gas and electricity for installation in Queens. The pipe is principally 48-inch diameter, and was noted in a recent issue as involving approximately 1800 tons.

Birmingham, Ala. — Production of pipe, particularly for municipal use, is at about the average of the past several weeks. Orders have not been impressive individually, but are more or less steady.

San Francisco — Bids have just been opened on 7052 tons of 12-inch cast iron pipe, under schedule 3748, for the Panama canal. Awards aggregated 186 tons, bringing the total to date to 35,586 tons, compared with 29,542 tons for the same period a year ago.

Seattle — Interest is lacking, inquiries are few and cast iron pipe agencies anticipate no improvement within 60 days. Several municipal projects await allocation of federal funds. Port Orchard, Wash., has

opened bids for a small tonnage of 4-inch pipe and accessories, alternate for transite. Collins Concrete & Steel Pipe Co., Portland, is low to Bonneville Authority for furnishing concrete reinforced and corrugated metal pipe for the Ampere station.

Steel Pipe Placed

2310 tons, steel pipe, principally 48 inches in diameter, department of water supply, gas and electricity, New York, to Alco Products Inc., New York.

Rails, Cars

Track Material Prices, Page 89

Only small scattered buying of cars and locomotives is being done, with some new repair programs getting under way. Pacific Fruit Express, subsidiary of Union Pacific and Southern Pacific will rebuild 2500 refrigerator cars in its own shops.

The Erie has placed seven diesel-electric switchers and the Newburg & South Shore one. Richmond, Fredericksburg & Potomac is inquiring for six baggage-express cars.

Car Orders Placed

Pacific Fruit Express Co., rebuilding 2500 refrigerators; to own shops.

Phillips Petroleum Co., 11 tank cars, 10 to American Car & Foundry Co., New York City, one to General American Transportation Corp., Chicago.

Car Orders Pending

Chief of procurement division, Washington, 36 mine cars; bids opened.

Navy, three steel box cars and three steel flat cars for delivery to Mare Island, Calif.; bids Dec. 1.

Richmond, Fredericksburg & Potomac, six baggage-express cars, bids asked.

Locomotives Placed

Erie, three diesel-electric switch engines of 1000 horsepower, to Electro-Motive Corp., La Grange, Ill., four 600-horsepower diesel-electric switch engines, to American Locomotive Co., New York.

Newburgh & South Shore, one diesel-electric switch engine of 1000 horsepower, to American Locomotive Co., New York.

Wire

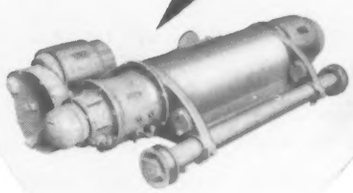
Wire Prices, Page 89

Cleveland — American Steel & Wire Co. has reaffirmed present base prices on low-carbon basic and bessemer wire for shipment up to and including March 31, 1940, for delivery and consumption in the United States. Hot-rolled rods, formerly priced per gross ton, will be priced per 100 pounds for delivery beginning Jan. 1. New Cleveland, Pittsburgh and Chicago base prices on rods are $2 on sizes No. 5 gage to 9/32-inch, and $2.15 on sizes over 9/32 to 47/64. This results in practically no net change on the latter and an advance of approximately 8 cents per 100 pounds on the former. Worcester base continues 10 cents higher. Extras applicable to hot-rolled rods also will be adjusted to a 100-pound basis. Nothing has been announced on merchant wire products, these commodities customarily not being covered by regular quarterly announcements.

Pittsburgh — Delivery problems continue to be encountered by producers of manufacturers' wire and merchant products. First quarter bookings are accumulating but some producers are actively quoting on export inquiries which have appeared in fair volume. Some business has been taken at sizable differentials over the domestic market. The latter prices have been reaffirmed for first quarter in the case of wire, with rods showing a small change through transferal to a 100-pound basis.

Boston—Orders for first quarter

OVERHEAD
Electric Traveling Cranes
CAPACITIES 1 TO 450 TONS



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shipment hold up well and wire mills have built up substantial backlogs. Demand is well diversified. There has been a slight decline in spring wire buying by bedding manufacturers, the latter having increased inventories.

Shapes

Structural Shape Prices, Page 88

Pittsburgh — Structural shape prices have been reaffirmed, as expected. Delivery problems have occurred in some building projects, but in most cases the flow of material has been satisfactory. Fabricated shape inquiries and awards recently have been almost entirely for public work.

Cleveland — Structural fabricators are looking for larger inquiries, pending work being mostly small jobs. Fairly good operations are in sight through December, but backlogs are receding. Delivery on plain material within three weeks is common.

Chicago—Structural shape orders are lighter, and inquiries for fabricated material generally are small. Outstanding is 2660 tons for six Illinois highway bridges closing this week. Recent awards have been light.

Boston—Structural contracts are few, small tonnages making up the bulk of buying which is estimated under 500 tons. Inquiry is also slack, bridge needs being estimated at 450 tons. Little plain material is being bought, but fabricated prices are somewhat steadier. Reliable reports have one of the old established fabricating shops in New England in the process of liquidation.

New York — Two local schools taking a total of 4650 tons are outstanding. Close to 1000 tons has been placed for New York and New Jersey state bridges. New work is coming out much more slowly, and inquiries apparently will be light the remainder of the year.

American Institute of Steel Construction reports estimated structural bookings for October at 112,097 tons, compared with a revised figure of 121,357 tons for September and 154,756 tons in October, 1938. Ten months' bookings this year were 1,114,606 tons, compared with 940,110 tons for the corresponding period last year. Shipments in October were 129,321 tons, compared with 140,828 tons in September and 105,032 tons in October, 1938. Ten months' shipments were 1,191,129 tons; in the same period last year, 952,434 tons.

Philadelphia — Several thousand tons of shapes will be required for a high-span bridge at St. George, Del., bids in January. Several other jobs are pending, but the outlook is only fair.

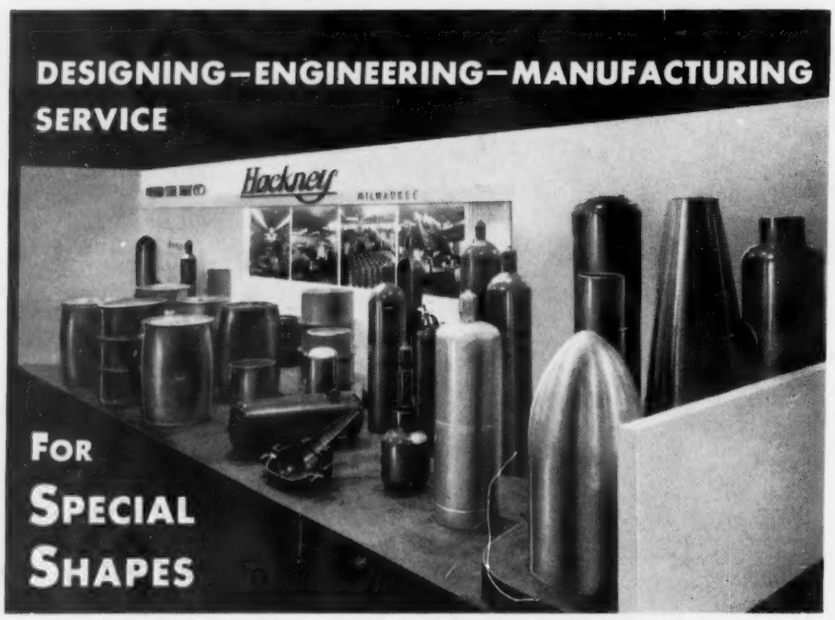
Seattle — The week's awards exceeded 3500 tons and included 2400 tons of sheet steel piling for a caisson at the Puget Sound navy yard dock and 700 tons of H-steel piling for a bulkhead, same project, to Bethlehem Steel Co., Seattle. Graybar Electric Co., Seattle, will furnish 565 steel, trackless trolley poles, 450 tons, for Seattle's transportation system.

San Francisco — Activity in the

Shape Awards Compared

	Tons
Week ended Dec. 2	23,914
Week ended Nov. 25	24,255
Week ended Nov. 18	18,736
This week, 1938	50,888
Weekly average, year, 1938	21,568
Weekly average, 1939	22,746
Weekly average, November	23,003
Total to date, 1938	1,001,309
Total to date, 1939	1,091,814

Includes awards of 100 tons or more.



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DEEP DRAWN SHELLS AND SHAPES

structural market has improved and over 26,600 tons now is pending. Awards totaled 3775 tons and brought the aggregate for the year to 150,295 tons, compared with 156,047 tons for the corresponding period in 1938.

Shape Contracts Placed

3150 tons, high school, Forest Hills, New York, to Harris Structural Steel Co., New York; Psaty & Fuhrman Inc. New York, general contractor.

3100 tons, addition to Consolidated Aircraft Co., San Diego, Calif.; allocated as follows; 2200 tons to Consolidated Steel Corp., Los Angeles and 900 tons to National Iron Works, San Diego.

3100 tons, sheet steel and H-piling, caisson and bulkhead for graving dock No. 4, Puget Sound Navy yard to Bethlehem Steel Co., Seattle.

1780 tons, renewal bridges, Norfolk & Western railroad, to Virginia Bridge Co., Roanoke, Va.; work in Virginia and West Virginia.

1690 tons, vocational school, East New York, N. Y., to Harris Structural Steel Co., New York, through D. M. W. Construction Co., Brooklyn.

1600 tons, cellophane plant, Clinton, Iowa, for E. I. du Pont de Nemours & Co., to American Bridge Co., Pittsburgh, on direct bids.

1000 tons, grade separation bridge, Saginaw, Mich., for state, to Bethlehem Steel Co., Bethlehem, Pa.

810 tons, bridge El, Cedar Rapids, Iowa, to Iowa Steel & Iron Works, Cedar Rapids, Iowa.

686 tons, deck seat grillages, bearing plates and accessories, Panama Canal, to United States Steel Export Co., Washington; bids Nov. 15, schedule 3712.

525 tons, filtration plant, Los Angeles, to Consolidated Steel Corp., Los Angeles.

500 tons, power plant, Alexandria, Va., for Virginia Public Service Corp., to Belmont Iron Works, Philadelphia, through Utility Management Corp., Reading, Pa.

455 tons, turret assembly shop, navy yard, Portsmouth, Va., to Ingalls Iron Works, Birmingham, Ala.

450 tons, trackless trolley poles, Seattle's transportation system, to Graybar Electric Co., Seattle.

400 tons, grade crossing, Willow street, Johnson City, N. Y., for state, to American Bridge Co., Pittsburgh.

390 tons, state bridge, project PSC-8586, Broome county, New York, to American Bridge Co., Pittsburgh.

380 tons, state highway bridge RC-4087, Phoenix, N. Y., to Lackawanna Steel Construction Co., Buffalo.

265 tons, bridge, Jefferson county, Kentucky, to American Bridge Co., Pittsburgh.

250 tons, state bridge RC-4074, New York, New Haven & Hartford railroad, Brewster, N. Y., to American Bridge Co., Pittsburgh.

235 tons, addition, Atlas Waste Mfg. Co., Glendale, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

230 tons, flood channel and bridges over Passaic river, Boonton, N. J., for state, to American Bridge Co., Pittsburgh.

225 tons, two bridges Montville and Caldwell, N. J., route 6, section 11, to American Bridge Co., Pittsburgh; Tidewater Construction Co., Newark, contractor.

220 tons, alterations to building, 310 South Michigan avenue, for Strauss Building Corp., Chicago, to Vierling Steel Works, Chicago.

200 tons, addition to building D, for Ciba Pharmaceutical Products Co., Summit, N. J., to Schaefer Iron Works, Edgewater, N. J.

185 tons, mill building, Henry Disston Sons Co., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.; direct bids.

185 tons, hangar, Minneapolis, Minn., to Crown Iron Works Co., Minneapolis.

175 tons, highway bridge, Andover, N. Y., to Bethlehem Steel Co., Buffalo.

165 tons, bridge No. 1862, Decatur, Ind., to Pan-American Bridge Co., New Castle, Ind.

165 tons, bridge FAM 84-A (1) El Paso county, Texas, to Mosher Steel Co., Dallas, Tex.

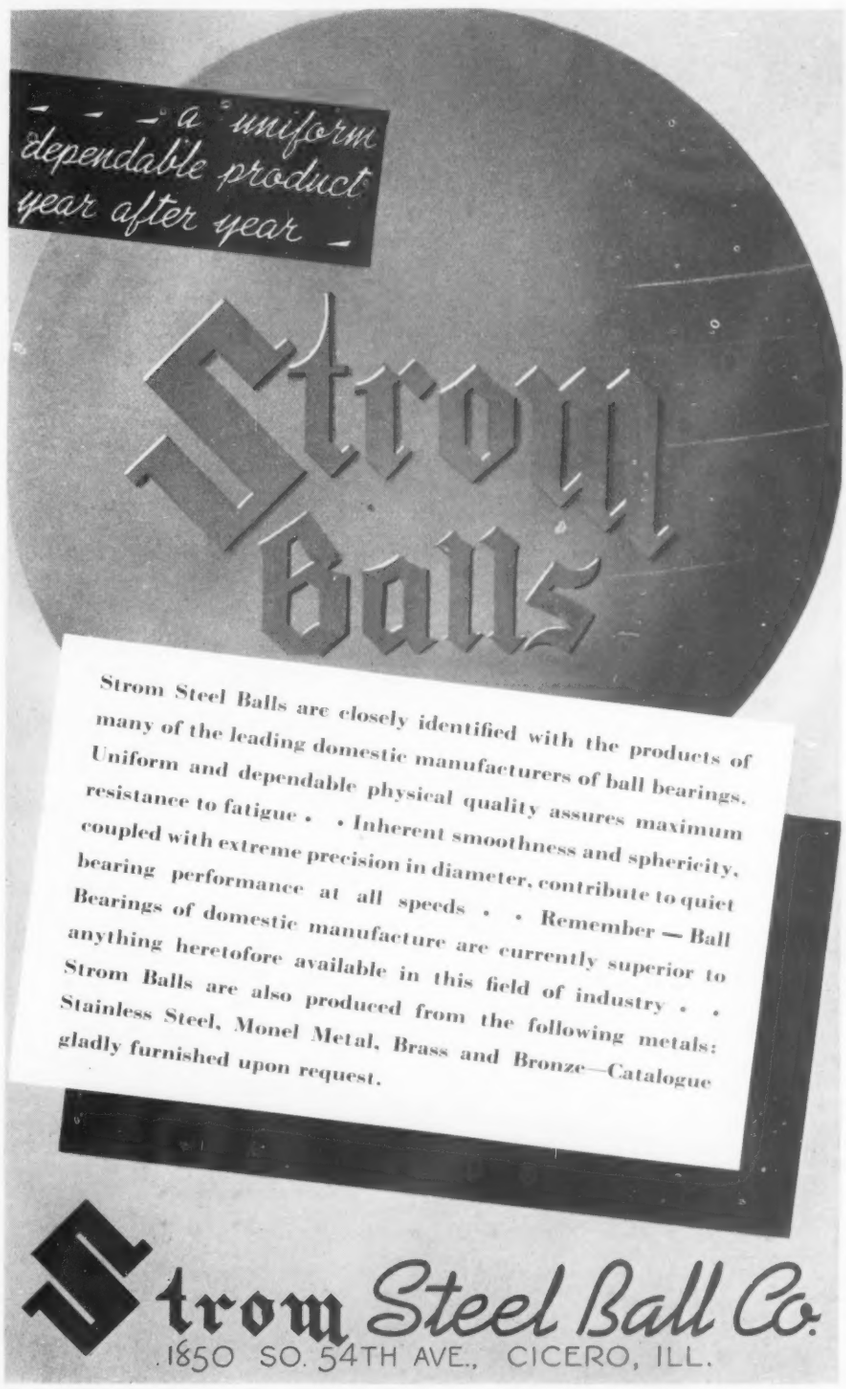
150 tons, bridge, Roosevelt avenue over Central Railroad of New Jersey, Carteret, N. J., three plate girder spans, 113 feet, to Bethlehem Steel Co., Bethlehem, Pa.; Franklin Construction Co., Newark, contractor.

140 tons, state highway project, Putnam county, New York, to American Bridge Co., through Thomas A. Brogan contractor.

130 tons, boiler supports, C. C. Moore Co., California, to Apex Steel Corp. Ltd., Los Angeles.

125 tons, I-beam bridges, Ryegate, Bethel and Wardsboro, Vt., to American Bridge Co.

120 tons, garage, for Terre Haute City Lines, Terre Haute, Ind., to Central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Strom Steel Balls are closely identified with the products of many of the leading domestic manufacturers of ball bearings. Uniform and dependable physical quality assures maximum resistance to fatigue • • Inherent smoothness and sphericity, coupled with extreme precision in diameter, contribute to quiet bearing performance at all speeds • • Remember — Ball Bearings of domestic manufacture are currently superior to anything heretofore available in this field of industry • • Strom Balls are also produced from the following metals: Stainless Steel, Monel Metal, Brass and Bronze—Catalogue gladly furnished upon request.
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Behind the Scenes with STEEL

Mr. Powell Comes To Town

■ Jim Powell, STEEL's unpredictable and unassuming Chicago Editor, dropped in last week for a few minutes to chat about most anything that came to mind. As he went on and on with the swing and gusto of Edwin C. Hill, we slyly snapped on our Ediphone to save for you and for history the following dribble:

■ Remember the big steel snow cruiser for the Antarctic expedition? Well, it was recently christened PENGUIN. That's a rather appropriate name isn't it? The thing not only is with Byrd, but on its recent cross-country jaunt it more or less demonstrated its ability to lay an egg. Get it?

■ In the Reich, they tell me, you can be arrested (and probably sent somewhere to concentrate) for throwing away an empty tooth-paste tube, account of the returnable value of the metal. But as yet Der Fooler apparently has not worked out any satisfactory way for disposing of old razor blades. Of course, an ingenious Chicago neighbor of mine solves it by giving his old blades to the children to play with.

■ That reminds me of a friend of mine—Mike, by name—who is certainly typical of this hustling, bustling age of metals. He's a copper with a tin badge, nerves of iron, muscles of steel, a heart of gold, silver hair, and with plenty of brass, but feet of lead. When they made him, they broke the mold, all right.

■ Down in Youngstown a fabricating company had a number of these red canteens installed —you know, those affairs that dispense candy when primed with a nickel. Well, instead of nickels a lot of Monel slugs started turning up in the machines. It turned out one of the boys had cut a die and turned out a bucketful of the phonies, much to the delight of his compadres, who munched away on an endless supply of free candy. The boss called the offender in and really put the heat to him, I guess, and there haven't been any more slugs since.

■ And say, did you notice where Yellow Cab Co. is building all its new cabs with glass tops? I view that with considerable alarm; not only does it cut down on the use of steel, but it marks the demise of the "Once - around - the - park - James era". When anyone above the second story can stare rudely in, romance is killed in the bud, no less.

■ An operations man gave me some blast furnace production figures the other day like this: "This little pig iron went to market, this little pig iron stayed home, and there was some little pig iron that was bad little pig iron and oxidized all the day long". Well, Shrd, ol' boy, I have to crank up the jalopy and start back for Chi. See you again.

Add—Puzzles

■ So long, Jim,—the next time we'll know better. There's just about enough space left here to squeeze in a nice tough problem from Floyd Petteys out in San Francisco who found the houses and hoses a simple push-over. *A man took a check to a bank to have it cashed. The teller made an error, giving him the amount of dollars that were indicated as cents and the amount of cents indicated as dollars. In other words he transposed the dollars and cents. On the way home the man spent* $3.50 *but when his wife asked coyly for the money, he found he had twice the amount the check originally called for. What was the amount of the check?* Or are you rather busy these days?

SHRDLU

—The Market Week—

States Bridge & Structural Co., Indianapolis, Ind.

110 tons, reinforcing forge shop 2, for Mesta Machine Co., Homestead, Pa., to American Bridge Co., Pittsburgh.

110 tons, state bridge 259, Racine, Wis., to Wisconsin Bridge & Iron Co., Milwaukee.

110 tons, bridge 526-4, beam spans, Marshfield, Wis., to Wausau Iron Works, Wausau, Wis.

106 tons, two-span, I-beam bridge, Wallingford, Vt., to Bethlehem Steel Co., through Edward L. Knight, South Royalton, Vt., contractor.

103 tons, state undercrossing Seattle, to Standard Steel Fabricating & Boiler Works Inc., Seattle; Gjarde Construction Co., general contractor.

100 tons or more, state bridge at Riverside, Mont.; W. P. Roscoe, Billings, general contractor.

100 tons, neoprene plant, Kearneys Point, N. J., for E. I. du Pont de Nemours & Co., to Belmont Iron Works, Philadelphia.

100 tons, beam bridge, Burlington county, New Jersey, to Bethlehem Steel Co., Bethlehem, Pa.

Shape Contracts Pending

7500 tons, hangars for various naval air stations, for U. S. navy.

5000 tons, appraisers' stores and immigration station, San Francisco; bids Dec. 15.

2000 tons, lock gates, Kentucky dam, Gravel Switch, Ky., for Tennessee Valley Authority.

1900 tons, state highway bridge, Antler, Calif.

1660 tons, bridge near Redding, Shasta county, Calif., for state; bids postponed from Nov. 22 to Dec. 6.

1600 tons, bridge on First street, Los Angeles; bids opened.

965 tons, race track grandstand, Albany, Calif.; bids soon.

875 tons, track supports, liner plate and accessories, Panama; bids in Dec. 4, pro. 3749.

500 tons, state highway bridge RC-4090, Dutchess county, New York.

243 tons, Sultan river bridge Snohomish county, Washington, for state; Rumsey & Co., 3821 Airport Way, Seattle, low on general contract at $92,392.

187 tons, interlocking sheet piling, United States engineer, Providence, R. I.; bids in pro. 168.

150 tons, wide flanged beams, navy yard, Mare Island, Calif., all bidders quoted 2.7925c, delivered, bids Nov 21, bureau of supplies and accounts, navy department, schedule 7739

145 tons, I-beam and truss bridges, Chester, Jamaica-Wardsboro, Vt.; bids Dec. 8, H. E. Sargent, commissioner of highways, Montpelier.

118 tons, underpass, Palo Alto, Calif., for state; Paul J. Tyler, P. O. Box 206, Oroville, Calif., low on general contract at $265,960.

115 tons, carriage weldment assemblies, Washington, for United States navy.

110 tons, dormitory, for Dennison university, Granville, O.

106 tons, two span I-beam bridge, Wallingford, Vt.; Edward L. Knight, South Royalton, Vt., general contractor; bids Nov. 24.

100 tons, buildings for Twelfth naval district, Mare Island, Calif., schedule 8083; bids opened.

100 tons, armory, Georgetown, Del.; bids Dec. 12.

Unstated, 606-foot state viaduct, Tillamook county, Oreg.; bids to highway commission, Portland, Dec. 7.

Reinforcing

Reinforcing Bar Prices, Page 89

Pittsburgh—Reaffirmation of concrete bar prices for first quarter is in line with expectations, many contracts already having been made on the present basis for delivery that will carry into next period. A fair tonnage of bars is pending, although inquiries are declining seasonally and awards are moderating, partly for the same reason.

Chicago—An estimated 7500 tons of bars will be required for the west substructure of the south side filtration plant here, bids Dec. 11. Other pending business is headed by requirements for the local subway, sewer construction and a government loading plant at Savanna, Ill.

Boston—Housing projects account for the bulk of reinforcing demand, several thousand tons being estimated for units at Bridgeport, Hartford and Holyoke. Current buying is light and limited to small lots. Prices are generally firm, although some scattered shading appears on larger lots.

New York — Except for purchase of several thousand tons for Panama, orders and inquiries are light. Most business is in small lots, and pending tonnage is the smallest in a long period. About 800 tons of mesh for upstate highways probably will not be bought until spring.

Seattle — No important reinforceing contracts are expected to develop before January, all the larger tonnages having been placed. Business pending does not exceed 500 tons, half being for Washington state road jobs. Rolling mills have backlogs to carry them into January. Bethlehem Steel Co., Seattle, is operating at 70 per cent of capacity, compared with 46 per cent in January, 62 per cent in February and 72 per cent in March.

San Francisco — The outlook in the reinforcing bar market is encouraging and more than 10,500 tons are now up for figures. Awards totaled 3361 tons, bringing the year's aggregate to 157,250 tons, compared with 143,089 tons for the same period last year.

Concrete Bars Compared

	Tons
Week ended Dec. 2	4,815
Week ended Nov. 25	1,847
Week ended Nov. 18	7,849
This week, 1938	8,547
Weekly average, year, 1938	6,959
Weekly average, 1939	9,579
Weekly average, November	5,806
Total to date, 1938	326,014
Total to date, 1939	459,827

Includes awards of 100 tons or more.

Reinforcing Steel Awards

950 tons, Sears, Roebuck & Co. building, 2650 East Olympic boulevard, Los Angeles, to Consolidated Steel Corp., Los Angeles.

850 tons, Fort Supply reservoir, Wolf Creek, Okla., to Sheffield Steel Corp., Kansas City, Mo.; through Capitol Steel & Iron Co., Oklahoma City, Okla.

700 tons, Harbor Hills housing project, Los Angeles, to Soule Steel Co., Los Angeles.

500 tons, plant, Quaker Maid Co., Terre Haute, Ind., to Bethlehem Steel Co., Bethlehem, Pa.; Turner Construction Co., contractor.

430 tons, Washington state highway projects in King county, to Bethlehem Steel Co., Seattle; Rumsey & Co. and N. Fiorito, Seattle, general contractors.

300 tons, building, navy yard, Brooklyn, N. Y., to Igoe Bros., New York, through Mill Basin Asphalt Co., New York, contractor.

250 tons, seawall and slips, navy yard, Brooklyn, N. Y., to Capital Steel Co., through Centaur Construction Co., New York, contractor.

225 tons, sewage disposal plant, New

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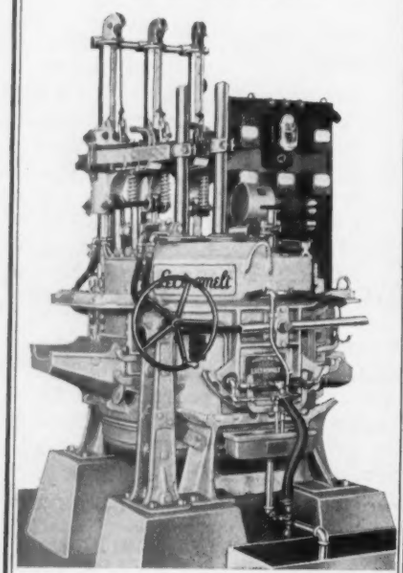

The illustration shows a small capacity three phase direct arc LECTROMELT furnace. Furnaces as small as 500 lb. capacity are being used for pouring forging ingots.

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London, Conn., to Concrete Steel Co., New York, through N. Benvenuti & Sons, New London, Contractors.

200 tons, silos, Pittsburgh Coal & Coke Co., Pittsburgh, to Bethlehem Steel Co., Bethlehem, Pa.; Nicholson Construction Co., contractors.

160 tons, building, Armstrong Rubber Co., Westhaven, Conn., to Topper & Griss, Hartford, Conn.

150 tons, soy bean warehouse, Swift & Co, Fostoria, O., to Calumet Steel Co., Chicago; James Stewart Co., contractor.

100 tons, Washington state highway project, Snohomish county, to Seattle Steel Co.; Rumsey & Co., Seattle, general contractor.

Reinforcing Steel Pending

7500 tons, west substructure, south side filtration plant, Chicago; bids to commissioner of public works, Dec. 11.

3275 tons, Sepulveda dam, United States engineer office, Los Angeles; bids Dec. 14.

1500 tons, housing project, New Haven, Conn.; taking bids.

700 tons, two drydocks, Pearl Harbor, T. H., specification 9100; bids Dec. 20.

635 tons, bridge near Redding, Shasta county, Calif., for state; bids postponed from Nov. 22 to Dec. 6.

565 tons, Salinas river bridge, Monterey county, California, for state; Utah Construction Co., 1 Montgomery street, San Francisco, low on general contract at $210,775.

500 tons, Chicago subway station section, Chicago.

400 tons, four buildings, state prison, Green Haven, N. Y.; bids Dec. 21.

300 tons, superstructure, municipal power plant, Cleveland; bids Dec. 6.

230 tons, Jonathan Pitney village housing project, Atlantic City, N. J.; bids Dec. 18.

200 tons, power plant, Public Service Co. of Indiana, Dresser, Ind.; Foundation Co., contractor.

200 tons, housing project Paducah, Ky.

180 tons, gymnasium, Northwestern university, Evanston, Ill., R. C. Wieboldt, Chicago, general contractor.

175 tons, Patten gymnasium, Northwestern university, Evanston, Ill.

170 tons, interceptor sewer, Rhode Island street, Gary, Ind.

150 tons, plant, Cleveland Illuminating Co., Cleveland.

118 tons, remodel bridge in Lincoln county, Oreg., for state; bids Dec. 7.

108 tons, 25 field officers and 143 company officers' quarters, Hickam Field, T. H., invitation 6812-40-46; bids Dec. 8.

Unstated, ten grain bins, for Port of Longview; plans in preparation.

Unstated tonnage, Illinois state highway department, six bridges; bids Dec. 5.

Unstated tonnage, government loading platforms, Savanna, Ill.; bids in.

Unstated tonnage, sewer requirements to Dec. 31, department of public works, Chicago; bids Dec. 6.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 89

Bolt and nut production continues near capacity, but with new orders off and with contract specifications tapering, reduction in output later this month is expected. Jobber specifications are lower, and railroads appear well covered for the present. First quarter books probably will be opened this week. Although steel prices have been reaffirmed, suggesting similar action on bolts, nuts and rivets, there is still some question as to what action may be taken. Costs have advanced steadily, and many sellers favor higher prices.

Pig Iron

Pig Iron Prices, Page 90

Cleveland—November iron shipments approximated those of October, and a sustained movement is in prospect for December. Heavier automotive needs are indicated with the reopening of Chrysler plants, and the seasonal letdown in foundry schedules this month is expected to be less than usual. Sellers have made no formal announcement regarding first quarter prices, and no immediate revision is looked for. Quotations generally were advanced $2 a ton in September.

Boston — Shipments are heavy, most consumers taking full commitments against old orders. New buying is slack. Practically no business was placed in anticipation of higher prices, and quotations are being reaffirmed. Foundry melt is high, but is curtailed somewhat by a shortage of molders.

New York—Pig iron producers indicate prices will be extended into next quarter, although formal action is awaited. November shipments showed an increase. Consumption continues heavy, although some consumers are stocking iron which by Jan. 1 will cover their needs well into first quarter. Export inquiry is lighter, partly because Scandinavian countries are unable to move iron inland by barge in freezing weather.

Buffalo—Shipments hold near the best level of recent years, but producers report no delay in filling requests for prompt deliveries. November deliveries were about equal to October's. Foundry operations are the best in two months. Pig iron producers generally do not look for a definite price announcement for first quarter until later this month.

Cincinnati — Silvery iron has been advanced $1 a ton on all grades, effective immediately. No change has been made on other grades, while by-product foundry coke has been reaffirmed for December delivery. Pig iron shipments were steady in November and releases received so far indicate a sustained movement in December.

St. Louis—Preliminary reports indicate that November pig iron ship-

ments will equal those of October, despite the shorter month and interrupting holiday. The melt of all grades of pig iron in November is estimated to be about 6 per cent greater than in October, most of the gain being at steel foundries and machine shops.

Birmingham, Ala. — No let-up is in sight, except for necessary repairs, in the district's iron output. Woodard, Sloss, Tennessee and Republic are operating at capacity, all 18 stacks active.

Toronto, Ont.—Sales are steady in lots up to 300 tons, with shipments against contracts sustained. First quarter books will be opened about the middle of December and orders are expected to equal or exceed tonnage entered this quarter. Possibility is seen of price revisions for next period. Additional blast furnaces may be blown in early next year to meet increased demand resulting from war needs.

Scrap

Scrap Prices, Page 92

Pittsburgh—Prices continue to decline on small purchases by mills. One steelworks has bought No. 1 steel at $19, and brokers have been offering relatively large tonnages at that price. This marks a $2 reduction since a week ago. Other grades are also lower. Railroad specialties have been offered at well below levels prevailing on last sales.

Cleveland—Lake cargoes en route and railroad lists about to close give the market a softer feeling in absence of important buying. Quotations are largely nominal.

Chicago—The market is weaker in spots, a number of grades being off 50 cents to $1. Heavy melting steel is unchanged but quiet in mill buying. Railroad steel specialties and cast grades have been most prominent in latest price reductions.

Boston — Prices continue weak, although fewer grades are being marked down. Borings and turnings, No. 1 machinery cast, mixed shafting and skeleton are 50 cents to $1 lower. Domestic buying is light, also export. More No. 1 steel for export is bringing $17, dock, while No. 2 and stove plate are off 50 cents, docks.

Philadelphia—Prices are off further, with additional business done at $19 for No. 1 steel and $18 for No. 2. Export buying is lacking because of a vessel shortage. Some scrap may be converted into ingots before shipment.

New York—Prices continue downward but at a less rapid pace. Heavy breakable and machinery cast are down 50 cents, f.o.b. cars, with heavy melting steel off a like amount for domestic delivery. Buying is light, but most mills are taking shipments against contracts. Foundry grades are dull.

Buffalo—Nominal reductions of 50 cents to $1 have been made in prices, largely a reflection of weakness in other districts. The break at Pittsburgh and elsewhere is cited by mills as reasons for reducing their bids, which brings No. 1 steel down to $19 to $19.50. No heavy buying is looked for until after the turn of the year.

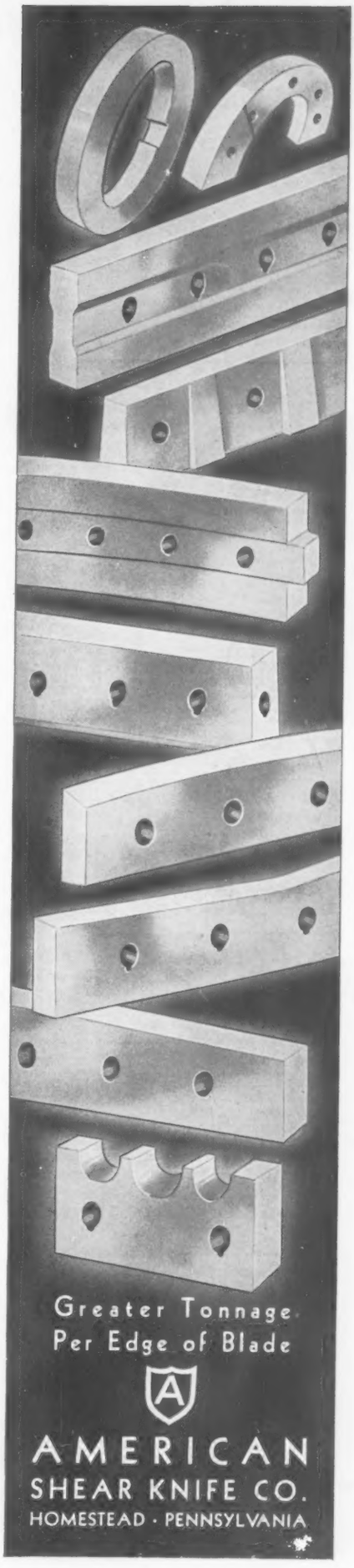
Detroit—Prices have tumbled 50 cents to $1.50 in the face of heavy production of scrap here and absence of mills from the market. With inventories laid down at higher prices, steelworks are resigned to a waiting policy and may not resume purchases until after Jan. 1.

Cincinnati—Heavy melting steel is unchanged, but some grades, including cast and malleable, are lower. Trading is light, with dealers wary of expanding stocks and mills purchasing cautiously. The undertone of the market is soft.

St Louis—Additional price reductions have been made in scrap, quotations on some grades, including steel specialties, being the lowest in a number of weeks. Consumer buying is inactive, mills and foundries being disposed to work on inventories until January. Offerings are moderate, some southwestern scrap being diverted to the Gulf for export.

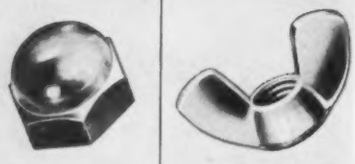
Seattle—Rolling mills are buying as requirements develop but aside from this movement the market is unusually quiet. New business from Japan is lacking as buyers are evidently awaiting the turn of events in this country. Consequently prices are uncertain. A guess is that export prices range from $16 to $17. Due to lessened sales of recent weeks, tidewater stocks have increased as country shippers have been forwarding considerable tonnages.

Toronto, Ont.—The market is active, both demand and offerings being heavier. Mills in the Hamilton district are taking all heavy melting steel offered and are renewing contracts frequently. Prices are unchanged, but dealers look for higher levels later in the year. Some grades are coming out in large lots and dealers are increasing yard stocks before severe weather curtails scrap collection in rural areas. Shortage of scrap in the Maritimes is causing large consumers there to turn to the Toronto market for supplies.



Socket Screws

Cap Nuts Wing Nuts



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Warehouse

Warehouse Prices, Page 91

Cleveland—Steady prices are indicated for coming weeks, in view of recent mill action. November sales were close to the October level, and in the case of some specialties reached a new peak for the year.

Chicago—November showed little change from October in sales, although usually a letdown occurs. The year-end holidays also are expected to have less than the ordinary depressing effect on December business.

Philadelphia—Business is quieter but still active. November sales were about the same as October or slightly lower. Warehouses still are short on some products.

Buffalo—With mill prices generally reaffirmed, warehouses would not be surprised if some letup appeared in recent urgent demand. However, no pronounced buying recession is looked for in the near future.

Cincinnati — Sales showed no month-end tapering, and the present outlook for December is for business near the level of the past three months.

St. Louis—Volume of orders has receded moderately since the middle of the month, but shipments continue at the recent high rate, and total for November will be about 6 per cent ahead of the preceding month. Warehouses are pressing mills for delivery, especially on sheets and strip.

Seattle—Volume of sales is unchanged with fair turnover for the season. Activity at the Puget Sound navy yard and other public works projects furnish considerable business for warehouses, bars, light plates and sheets leading, with sales in small tonnages.

Steel in Europe

Foreign Steel Prices, Page 91

London—(*By Cable*)—Great Britain expects an increase in pig iron production when larger supplies of iron ore are available. Steelworks and finishing mills continue to operate at capacity and sheets now are available for export. Tin plate exports are active. Belgium and Luxemburg report gratifying export trade to Scandinavia, the Argentine and the Near East. Output is satisfactory and current events influence price fluctuations.

Ferroalloys

Ferroalloy Prices, Page 90

New York — Announcement of first quarter ferromanganese prices is not looked for until about the middle of December, and it is still uncertain whether or not an increase will be made. A similar situation prevails in spiegeleisen. Tungsten alloys are firm, reflecting a stable ore market. The navy will open bids Dec. 8 on 250,000 pounds of ferrosilicon for its eastern yards and on 2200 pounds for Puget Sound, with bids at the same time on 50,000 pounds of ferromanganese for eastern yards and 3800 pounds for western yards.

Tin Plate

Tin Plate Prices, Page 88

Prices on tin plate, manufacturing ternes and other coated tin mill products have been reaffirmed for shipment through next March 31, it was announced late last week by Carnegie-Illinois Steel Corp. Pittsburgh and Gary base prices will continue $5 per base box on tin plate and $4.30 on special coated manufacturing ternes. These prices apply for delivery and consumption in the United States.

Tin plate production continues at capacity, with backlogs still large, but orders are moderating. Specifications have been so heavy in recent weeks some sellers believe inventories have been increased substantially, if not in tin plate, then in containers. Export demand continues brisk, particularly from Canada, South America and Portugal, although shipments to Scandinavian countries are off slightly.

Refractories

Refractories Prices, Page 90

New York — While prices on clay and silica brick have been extended for first quarter, books have not yet been opened on magnesite and basic refractories. This, however, should develop in the near future. Prices have also been extended on malleable bung brick and ladle brick, and in reaffirming quotations for next quarter, sellers point out quotations are subject to acceptance within ten days and to change without further notice, with all shipments to be made not later than March 31.

Coke Oven By-Products

Coke By-Product Prices, Page 89

New York—Despite heavy production of coke oven by-products, demand exceeds supplies and available stocks are short at unchanged and firm prices. Lacquer makers are taking large shipments of tol-

uol, chemical industries substantial quantities of benzol while miscellaneous producers of coatings are working off xylol in good volume. Buying of phenol by the plastic trade is heavy. Domestic requirements of sulphate of ammonia are such as to prevent most distributors taking on all the export trade offered.

Iron Ore

Iron Ore Prices, Page 92

Cleveland — November iron ore shipments from upper lake ports were the largest for that month in 22 years. The movement totaled 5,472,605 gross tons, an increase of 269.4 per cent over a year ago, according to the Lake Superior Iron Ore association. Best previous November figures were 7,333,828 tons in 1917 and 5,715,452 in 1916.

Shipments for the season to Dec. 1 were 45,066,175 tons. This was 134 per cent more than was moved in 1938 but was 29 per cent less than in 1937. Comparisons follow:

	To Dec. 1 1939	To Dec. 1 1938
Escanaba	2,531,260	1,077,809
Marquette	639,622	178,539
Marquette	3,819,272	1,154,499
Ashland	3,700,026	1,581,148
Ashland	1,641,913	693,453
Superior	13,316,479	6,149,654
Superior	697,642	313,475
Superior	910,892	360,359
Duluth	9,081,476	3,920,961
Two Harbors	8,663,503	3,833,114
Michipicoten	64,090	.....
Total	45,066,175	19,263,011

Equipment

Seattle — Electrical equipment is in best demand, Bonneville authority still a heavy buyer. This Portland office opened bids Nov. 27 for inlets, rings and miscellaneous items and Dec. 1 for two transformers for the Raymond substation, and Dec. 4 for 10 relays, transformer units, etc. Spec. 646. Bids are called Dec. 11 for 2258 insulator pedestals, and Dec. 7 for bus materials, Spec. 642. General Electric Co. is low at $67,120 for furnishing alternating current network analyzer for the Ampere station. U. S. engineer, Bonneville, has called figures Dec. 21 for 15 kv. metal enclosed buses, Spec. 694-40-79.

St. Louis—St. Louis Southwestern has filed with federal court a list of machine tool equipment for its 1940 program totaling $211,333, including a large variety of tools. The budget includes $544,948 for freight car building and repair; a 25-ton locomotive magnet crane; 250-ton steam wrecker.

October Scrap Melt Sets New Record

■ Scrap consumption in October by steel mills, blast furnaces and foundries is estimated at 3,974,000 gross tons, by the Institute of Scrap Iron and Steel Inc., New York. This apparently is an all-time record and an increase of 68 per cent over 2,393,000 tons in October, 1938.

For ten months domestic consumption was 27,176,000 tons, compared with 16,385,000 tons in the corresponding period of 1938, and 21,528,000 tons in all of last year. Indicated consumption this year is 34,000,000 tons, according to the institute, which compares with the all-time record of 38,006,272 tons in 1937.

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Buffalo Detroit New York Philadelphia Boston

Nonferrous Metals

New York—Undertone of nonferrous metal markets was easier last week and offerings were generally freer. Despite a ¾-cent drop in casting copper and a decline in resale copper quotations on the outside market, several fabricators advanced their prices for copper and brass rolled products.

Copper — American Brass Co., Bridgeport Brass Co. and Phelps Dodge Copper Products Co. advanced their prices ¼-cent on all products except free turning yellow brass rods, electro sheet copper and scrap which remained unchanged. The new prices were effective as of Dec. 1. Demand for electrolytic was lighter but producers continued to quote on the 12.50-cent basis. Buying interest in the export market was also light with prices slipping to around 12.90c f.a.s.

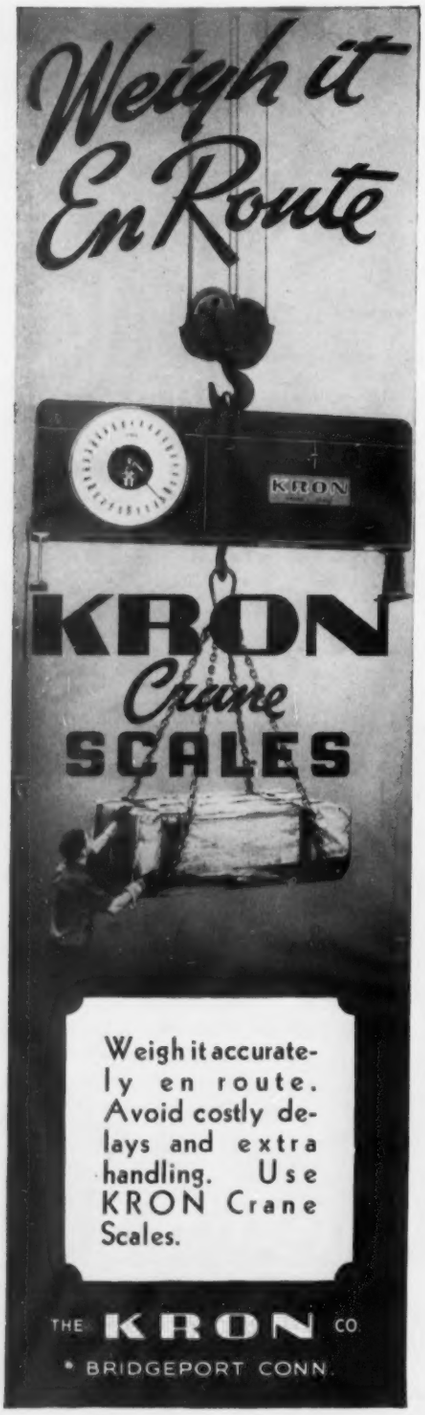
Lead — Consumers were able to get whatever tonnages they sought, except certain brands for which a small waiting list remains. Turnover was moderate and this, coupled with expectations of a further drop of 15,000 tons in refined stocks for the month just ended, tended to keep prices firm.

Zinc — A definite weakness in prices was discernible late in the week with an unconfirmed sale reported at 6.00c, East St. Louis. The market was quotably unchanged at the close, however, at 6.50c, East St. Louis. Producers appear to be anxious to build up their order backlogs which have declined recently.

Tin — Straits spot declined steadily, reaching 52.50c at the close. Although tin plate mill operations are still above 95 per cent of capacity and prices have been reaffirmed for the next quarter, consumers showed only light buying interest in the pig tin. Importers reported continued difficulty in covering in the East.

Antimony—With the exception of one or two carlots, business was routine and for case lots. Prices were unchanged at 14.00c, New York, for American spot in cases and nominally 16.50c, duty paid New York, for Chinese spot.

■ Malleable iron castings production in October was 54,263 net tons, compared with 41,427 tons in September and 29,970 tons in October, 1938, as reported to the bureau of the census. Orders booked totaled 63,835 tons in October, 64,732 tons in September and 32,770 tons in October, 1938.



Nonferrous Metal Prices

Nov.	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin, New York *Spot	Straits Tin, New York *Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
25	12.50	12.50	12.75	53.50	51.00	5.50	5.35	6.50	20.00	14.00	35.00
27	12.50	12.50	12.75	54.50	52.00	5.50	5.35	6.50	20.00	14.00	35.00
28	12.50	12.50	12.75	54.00	52.00	5.50	5.35	6.50	20.00	14.00	35.00
29	12.50	12.50	12.75	53.75	51.75	5.50	5.35	6.50	20.00	14.00	35.00
30	12.50	12.50	12.50	53.00	51.50	5.50	5.35	6.50	20.00	14.00	35.00
Dec. 1	12.50	12.50	12.37½	52.50	50.25	5.50	5.35	6.50	20.00	14.00	35.00

*Nominal.

MILL PRODUCTS

F.o.b. mill base, cents per lb., except as specified. Copper brass products based on 12.50c Conn. copper

Sheets

Yellow brass (high)	19.06
Copper, hot rolled	20.87
Lead, cut to jobbers	8.75
Zinc, 100 lb. base	11.25

Tubes

High yellow brass	21.81
Seamless copper	21.37

Rods

High yellow brass	15.23
Copper, hot rolled	17.37

Anodes

Copper, untrimmed	18.12

Wire

Yellow brass (high)	19.31

OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York	8.37½-8.50
Cleveland	9.25-9.50
Chicago	8.75-9.00
St. Louis	8.50-8.75

Heavy Copper and Wire

New York, No. 1	10.00-10.25
Cleveland, No. 1	10.25-10.50
Chicago, No. 1	10.00-10.25
St. Louis	9.75-10.00

Composition Brass Turnings

New York	8.00-8.25

Light Copper

New York	8.00-8.25
Cleveland	8.25-8.50
Chicago	7.87½-8.12½
St. Louis	7.75-8.00

Light Brass

Cleveland	5.00-5.25
Chicago	5.62½-5.87½
St. Louis	5.00-5.50

Lead

New York	4.85
Cleveland	4.37½-4.50
Chicago	4.25-4.50
St. Louis	4.00-4.25

Zinc

New York	3.50-3.75
Cleveland	3.25-3.50
St. Louis	3.75-4.00

Aluminum

Mixed, cast, Cleveland	10.25-10.50
Borings, Cleveland	7.25-7.50
Clips, soft, Cleveland	16.00-16.50
Misc. cast, St. Louis	8.25-8.50

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads	13.75
Standard No. 12 aluminum	15.00-15.25

Construction and Enterprise

Ohio

COLUMBUS, O.—City, L. Lewis, president, purchasing board, 101 city hall, is taking bids due noon, Dec. 7 on one gasoline engine-driven portable air compressor.

DAYTON, O.—Contracting officer, materiel division, Wright field, takes bids to 10 a.m., Dec. 7 on two horizontal milling machines; 10 a.m., Dec. 11, one precision lathe, one benchgrinder and one drill press; 10 a.m., Dec. 12, bids on lot quantities of 80, 100, 120 or 140 cylindrical tanks of 25,000 gallon capacity, 12,-081 punches of miscellaneous types.

MIAMISBURG, O.—City, Joseph E. Poduk, service director, plans purchase of boiler and stoker for municipal power and light plant; contemplates purchase of new turbine to handle increased electric load later. Leo Wall is city engineer; consulting engineer to be retained.

NEWARK, O.—City, Fred L. Simross, representative, contemplates construction of sewage treatment plant costing $300,000. Maturity of plans dependent upon WPA approval and assistance. Burgess & Niple, 568 East Broad street, Columbus, O., consulting engineers.

SABINA, O.—Village, Harry G. Burris, clerk, plans additions to waterworks and electrical generating plant, including two diesel engines and generating equipment at cost of approximately $60,000. Special $42,000 bond issue was approved recently. Fosdick & Hilmer, Union Trust building, Cincinnati, consulting engineers. (Noted Sept. 11.)

ST. MARY'S, O.—City, L. E. Botkin, council president, city hall, contemplating installation of 2500-kilowatt steam turbine, 3500-pounds pressure boiler and suitable condenser, to furnish current for new Goodyear Tire & Rubber Co. plant here. Service director, Mont Youngs, authorized to advertise for bids. Bond issue will be necessary.

Connecticut

WEST HAVEN, CONN.—Armstrong Rubber Co., Elm street, plans installation of electric power equipment in new 100 x 150 foot, 4-story plant addition. Project to cost about $200,000. Fletcher-Thompson Inc., 1336 Fairfield avenue, Bridgeport, Conn., is architect and engineer.

Maine

AUGUSTA, ME.—Hudson Pulp & Paper Corp. has awarded general contract for a 2-story sulphite mill, 100 x 130 feet, replacing one destroyed by fire, to James Leck Co., 211 South Eleventh street, Minneapolis.

Massachusetts

EAST BRIDGEWATER, MASS. — Machine shop and pattern shop of Old Colony Foundry, Charles L. Nutter, president, was recently damaged by fire with estimated $50,000 loss. Reconstruction starting immediately.

New York

DANSVILLE, N. Y.—City contemplates construction of $109,000 sewage disposal plant and will vote on special bond issue soon. G. W. Moore is engineer.

SPRINGVILLE, N. Y.—City plans construction of sewage disposal plant and system. Total estimated cost, $668,000.

Michigan

DETROIT—Bart Tool & Die Co., 2228 Fenkell avenue, has been incorporated with $50,000 capital to manufacture dies, jigs and fixtures. Donald V. Hungerford is representative.

Illinois

CHICAGO—Acme Steel Co., 2840 South Archer street, plans installation of heavy duty motors and controls, regulators, conveyors, electric hoists, other equipment in new addition to mill in Riverdale, Ill. Work scheduled to start immediately. Cost estimated at over $1,000,000.

CHICAGO—Ford Motors Co., Dearborn, Mich., plans installation of motors and controls, regulators, conveyors, electric hoists, other equipment in new addition to branch assembly plant at 12600 South Torrance street. Power plant will be enlarged, additional equipment installed for increased capacity. Cost of entire project about $250,000.

DECATUR, ILL.—Rath Packing Co., Sycamore street, Waterloo, Iowa, meat packer, has approved plans for a 1-story cold storage and refrigerating plant here. Cost estimated at $180,000, including equipment. (Noted Oct. 30).

DIXON, ILL.—Reynolds Wire Co., South Crawford street, plans installation of power equipment in 1-story addition to plant on which work is to

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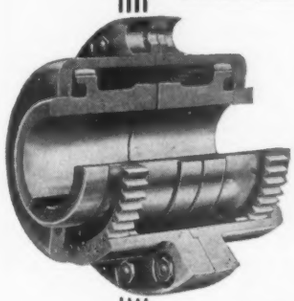

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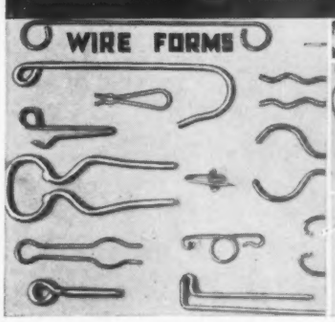

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proceed immediately. Total cost to be approximately $170,000.

FRANKLIN PARK, ILL. — Franklin Park Frozen Foods Inc., J. R. W. Anderson, 1110 Harrison street, Oak Park, Ill., engineer, plans boiler house at new plant here. Will also install refrigeration machinery and power equipment; entire project scheduled to cost more than $125,000.

ROCK ISLAND, ILL.—Peoples Power Co. has purchased sites for automatic transformer stations at Rock Island and Moline, Ill.; each is to cost about $75,000.

Indiana

COLUMBUS, IND.—Cummins Engine Co. has awarded contract for design and construction of a 10,000 square foot research and development laboratory to the Austin Co., Cleveland. A machine shop and special metallurgical and chemical laboratories are included. Work to be completed shortly after Jan. 1.

MARTINSVILLE, IND.—Morgan county REMC, F. C. Lichtenauer, president, will build 45 miles rural transmission line in Morgan, Monroe, Brown and Owen counties; has $150,000 REA loan.

Missouri

RAYMONDVILLE, MO.—Shipp planing mill was damaged by fire; loss approximately $20,000.

Arkansas

EVERTON, ARK.—M. L. Birch and associates, Little Rock, Ark., plan construction of 50-ton concentrating plant on 30 acre site.

Oklahoma

NORMAN, OKLA.—Oklahoma electric co-operative, E. W. Cralle, superintendent, plans construction of 62 miles rural transmission line in five counties. Association has been granted $50,000 REA allotment.

PONCA CITY, OKLA.—Continental Oil Co., 60 East Forty-second street, New York, plans installation of power equipment in connection with expansion and improvements in oil refinery here. Total cost to be about $1,500,000.

Minnesota

APPLETON, MINN.—Minnesota state department of administration, Miles S. Cooper, director, is taking bids to 1 p.m., Dec. 7, on one No. S-60F Pacific steel smokeless low-pressure boiler or its equal, for military department, as per specifications on file with director.

FARIBAULT, MINN.—City, T. A. Mealia, clerk, has authorized Frank W. McKellip, city engineer, to prepare an estimate on installation of an auxiliary power unit at its pumping station.

ST. CLOUD, MINN.—Northern States Power Co., H. H. Watson, 15 South Fifth street, Minneapolis, general construction superintendent, will soon start work on new 60 x 120 foot electric generator station to cost $600,000, including equipment. A 7500 kilowatt steam-driven generator and boiler will be installed.

Texas

FLOYDADA, TEX. — Floyd County Rural Electric Co-operative Inc., Carl C. Cox, 619 Oliver-Eakle building, Amarillo, Tex., engineer, receives bids Dec. 7 on 86 miles of rural transmission line in Floyd, Hale, Crosby and Dickens counties.

UVALDE, TEX.—City plans improvement to sewage disposal plant and removal of plant to new site. Cost estimated at $49,000.

Kansas

KANSAS CITY, KANS.—Meyer Kornblum Packing Co., 300 Central avenue, meat packer, plans installation of power equipment in new 2-story, 50 x 120 foot plant addition. Entire unit to cost nearly $70,000. Carl Schloemann, 6329 Bonita avenue, Clayton, Mo., is architect.

Nebraska

AUBURN, NEBR. — Nebraska state railway commission has granted Merrick county rural public power district authority to construct 109 miles rural transmission lines in Merrick county.

BURCHARD, NEBR. — Village, Joe Craig, clerk, is taking bids to 2 p.m., Dec. 13, on construction of waterworks system, including a 25,000-gallon storage tank on a 70-foot tower. H. H. Henningson Engineering Co., 1904 Farnam street, Omaha, Nebr., is consulting engineer. Certified check 5 per cent to accompany bid.

LEXINGTON, NEBR.—Dawson county rural public power district has filed application with state railway commission for permission to construct 272 miles rural transmission lines in Dawson county. Raymond H. Reed, Abilene, Kans., consulting engineer.

LINCOLN, NEBR. — State railway commission has granted Eastern Nebraska public power district authority to construct 231½ miles of rural transmission lines in Johnson and Pawnee counties. H. H. Henningson Engineering Co., 1904 Farnam street, Omaha, Nebr., is consulting engineer.

ST. PAUL, NEBR.—Nebraska state railway commission has granted Howard county rural public power district authority to construct 147 miles of revision lines and extensions to its rural transmission lines.

Iowa

LOWDEN, IOWA—City, Ezra Kruckenberg, clerk, will hold a special election soon to determine issuance of $70,000 bonds for construction of municipal power and light plant.

STORY CITY, IOWA—City, Stanton James, clerk, is taking bids to 1 p.m., Dec. 19 on improvements to power plant, including one 225 horsepower diesel engine, with closed cooling system. Ralph W. Gearhart, Cedar Rapids, Iowa, is consulting engineer. Certified check 5 per cent to accompany bid.

WAUKON, IOWA—City plans construction of a municipal power and light plant. Hubbard Engineering Co., 80 East Jackson boulevard, Chicago, is conducting survey to determine cost. Iver Thorson is city clerk.

Pacific Coast

BENICIA, CALIF.—American Can Co.'s 3-acre plant, including two warehouses, was swept by fire recently. Loss estimated at $200,000.

LOS ANGELES—Ace Wire & Iron Works Inc. has been organized in Los Angeles county with $25,000 capital stock. A. E. Perkins, Vera E. Coles, Alhambra, Calif., and L. D. Sisson, Burbank, Calif., are directors. Corporation is represented by Frank Lober, 815 South Hill street.

LOS ANGELES—Kennedy Name Plate Co., 4500 Pacific avenue, plans immediate erection of addition to factory building. No cost estimate available as yet.

LOS ANGELES—W. L. Slimp, 8765 Avalon boulevard, is erecting a new machine shop on 40 x 90 foot site.

CORVALLIS, OREG.—Bids will be invited soon for first unit, 140 miles, of proposed $260,000 power line construction for Benton and Linn county co-operative. Organization financed by REA.

HEPPNER, OREG.—H. O. Wray and Orville Smith, owners of the Heppner Lumber Co., recently destroyed by fire, are planning replacement of plant. Machinery and equipment reported rendered worthless. Amount of loss not announced as yet.

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GARAGE IN CONNECTION

PENDLETON, OREG.—City is considering water system improvements and replacements. John N. Adams, Seattle engineer, is conducting survey.

SPRINGFIELD, OREG.—Local and outside interests are contemplating construction of linen mill here. Survey is being conducted.

GARFIELD, WASH.—Lincoln county co-operative rural electric association is awaiting allocation of $200,000 REA fund for construction of 200 miles rural transmission line in Lincoln county.

SPOKANE—Industrial Tungsten Corp., 726 Hutton building, has been organized by Ray B. Greene and associates with $100,000 capitalization.

TOPPENISH, WASH.—Benton rural electric association plans extension of rural transmission lines in local area and near Wapato, Wash., early next year; to cost approximately $150,000.

VANCOUVER, WASH.—Taylor Spruce Co. is enlarging plant; will install new machinery and equipment.

Canada

NEW WESTMINSTER, B. C. — Peter Bain Lumber Co. will erect $50,000 sawmill here, plans purchase of equipment for same.

PRINCE RUPERT, B. C.—City council, A. M. Patterson, mayor, has plans under consideration for construction of new power plant to cost $25,000.

ST. JOHN, N. B.—Wilson Box Co. contemplates erection of factory at estimated cost of $75,000.

DUNDAS, ONT.—John Bertram & Sons Co. Ltd., 15 Flatt avenue, machinery manufacturers, are considering plans for factory addition consisting of two 1-story buildings. Hutton & Souter, 36 James street, South, Hamilton, Ont., architects.

FT. FRANCIS, ONT.—J. A. Mathieu Sawmill Co. will construct drying kiln, make other improvements costing $50,000.

FT. WILLIAM, ONT. — Great Lakes Lumber Co. Ltd. contemplates construction of sawmill and planing mill at cost of $100,000 here. By-law to be submitted to ratepayers, and upon approval, construction to start within a month.

HAMILTON, ONT.—Steel Co. of Canada Ltd. has let steel contract to Hamilton Bridge Co. for 1-story plant addition, 100 x 130 feet.

LEASIDE, ONT.—L. A. Young Industries of Canada Ltd., 187 Geary avenue, Toronto, Ont., has started work on 1-story plant, 200 x 320 feet.

LONDON, ONT.—Taylor Electric Co. contemplates erection of factory unit to cost $40,000.

MERRITTON, ONT.—Hayes Steel Products Ltd. has started erection of plant addition providing 10,000 square feet of floor space. Will cost $50,000 exclusive of equipment.

OSHAWA, ONT.—Dr. Leopold Stein, care of F. E. Hare, city clerk, plans erection of glass manufacturing factory. Formation of new company, purchase of 13 acre site is contemplated.

PORT LORING, ONT. — E. Donnelly, Gilden Valley, Ont., is having plans prepared for erection of sawmill here. Will purchase equipment needed for mill.

TORONTO, ONT.—City, Ralph Day, mayor, will hold election Jan. 1 on installation of sewage disposal plant on Ashbridges Bay, costing $5,600,000.

TORONTO, ONT.—Canada Motor Products has acquired new premises on Van Horne street, will equip same for manufacturing purposes.

TORONTO, ONT. — McColl Frontenac Oil Co. plans construction of series of refining plants to cost about $300,000.

TORONTO, ONT. — Acme Paper Box Co., 388 Carlaw avenue, will start work immediately on erection of $100,000 paper board factory.

TORONTO, ONT.—Canadian Hanson & Van Winkle Co. Ltd., 2 Silver street, has awarded contract for $30,000 plant addition to machine shop.

TORONTO, ONT.—International Harvester Co. Ltd., H. E. Miller, local manager, has started work on erection of $185,000 motor truck service building and sales office.

WATERLOO, ONT.—Canadian Barrels & Kegs Co. Ltd., Shantz street, will build plant addition at cost of $20,000.

WINDSOR, ONT. — Chrysler Motor Corp. of Canada Ltd., Tecumseh road, will build plant addition consisting of three 1-story buildings. Hutton & Souter, 36 James street, South, Hamilton, Ont., architects.

ARVIDA, QUE.—Aluminum Co. of Canada Ltd., Montreal, Que., is considering plans for addition to smelter here.

2087 USED MACHINE TOOLS FOR SALE

Reo Motor Car Company, being ready to start the manufacture of trucks and coaches under the trustee's plan of reorganization and having discontinued the manufacture of passenger cars, has 2,087 surplus general-purpose machine tools for sale, as is and where is.

This machinery is ready for inspection at the company's plant in Lansing, Michigan. Complete lists are available and will be furnished on request.

Sealed bids for the entire lot, accompanied by a certified check for 10% of bid must be filed with the Trustee at Lansing, Michigan, on or before 12 o'clock noon of December 7, 1939. These bids will be reported to the court for acceptance or rejection on December 8, 1939.

Bids must be for the entire lot only and bidders must be prepared to deposit with Trustee immediately on acceptance of bid an additional 15% of bid, the total deposit to be held by Trustee until purchase price is paid down to deposit. All machines must be paid for before removal from plant. Entire purchase price to be paid within 90 days.

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Cadman, A. W., Mfg. Co., 28th and Smallman Sts., Pittsburgh, Pa.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.

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Ames Bag Machinery Co., 1991 E. 66th St., Cleveland, O.

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Logeman Brothers Co., 3126 Burleigh St., Milwaukee, Wis.

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Enterprise Galvanizing Co., 2525 E. Cumberland St., Philadelphia, Pa.
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Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
New Departure Div., General Motors Corp., Bristol, Conn.
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Fig 1641

Fig. 1645
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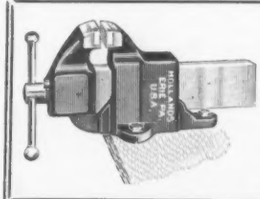

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*Firth-Sterling Steel Co., McKeesport, Pa.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Pittsburgh Steel Co., 1653 Grant Bldg., Pittsburgh, Pa.
*Republic Steel Corp., Dept. ST, Cleveland, O.
Standard Steel Works Co., Paschall P. O., Philadelphia, Pa.
Stanley Works, The, New Britain, Conn. Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
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Lamson & Sessions Co., The, Cleveland, O.
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Wilson, Lee, Engineering Co., 1370 Blount St., Cleveland, O.

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Cincinnati Shaper Co., Elam and Garrard Sts., Cincinnati, O.

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Carborundum Co., The, Perth Amboy, N. J.
Norton Co., Worcester, Mass.

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Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Industrial Brownhoist Corp., Bay City, Mich.

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American Gas Furnace Co., Elizabeth, N. J.
Kemp, C. M., Mfg. Co., 405 E. Oliver St., Baltimore, Md.
Peabody Engineering Corp., 580 Fifth Ave., New York City.
Pennsylvania Industrial Engineers, 2413 W. Magnolia St., Pittsburgh, Pa.
Surface Combustion Corp., 2375 Dorr St., Toledo, O.
Wean Engineering Co., Warren, O.
Wilson, Lee, Engineering Co., 1370 Blount St., Cleveland, O.

BURNERS (Fuel, Oil, Gas, Combination)
American Gas Furnace Co., Elizabeth, N. J.
Babcock & Wilcox Co., The, 19 Rector St., New York City.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh, Pa.
Peabody Engineering Corp., 580 Fifth Ave., New York City.
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CAP SCREWS—See SCREWS (Cap, Set, Safety-Set)

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Alliance Machine Co., The, Alliance, O.
Industrial Brownhoist Corp., Bay City, Mich.
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CAR PULLERS and SPOTTERS
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Link-Belt Co., 2410 W. 18th St., Chicago, Ill.

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Linde Air Products Co., The 30 E. 42nd St., New York City.
National Carbide Corp., 60 E. 42nd St., New York City.

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Houghton, E. F. & Co., 240 W. Somerset St., Philadelphia, Pa.

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Bethlehem Steel Co., Bethlehem, Pa.
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Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn. 322 Vulcan St., Buffalo, N. Y.
International Nickel Co., Inc., The, 67 Wall St., New York City.
Meehanite Metal Corp., 311 Ross St., Pittsburgh, Pa.
National Alloy Steel Co., Blawnox, Pa.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Shenango-Penn Mold Co., Dover, O.

CASTINGS (Alloy Steel)
Babcock & Wilcox Co., The, 19 Rector St., New York City.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Continental Roll & Steel Fdry. Co., E. Chicago, Ind.
Damascus Steel Casting Co., New Brighton, Pa.
Ohio Steel Fdry. Co., Lima, O.
Pittsburgh Rolls Corp., 41st and Willow Sts., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell St., Chicago, Ill.
Union Steel Casting Co., 62nd and Butler Sts., Pittsburgh, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.
Youngstown Alloy Casting Corp., 103 E. Indianola Ave., Youngstown, O.

CASTINGS (Brass, Bronze, Copper, Aluminum)
Bartlett-Hayward Div., The Koppers Co., Baltimore, Md.
Bethlehem Steel Co., Bethlehem, Pa.
Cadman, A. W., Mfg. Co., 28th and Smallman Sts., Pittsburgh, Pa.
Morgan Engineering Co., The, Alliance, O.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Shenango-Penn Mold Co., Dover, O.
Shoop Bronze Co., The, 344-60 W. 6th Ave., Tarentum, Pa.
Titan Metal Mfg. Co., Bellefonte, Pa.

CASTINGS (Brass, Pressure)
Titan Metal Mfg. Co., Bellefonte, Pa.

CASTINGS (Die)—See DIE CASTINGS

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Damascus Steel Casting Co., New Brighton, Pa.
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn. 322 Vulcan St., Buffalo, N. Y.
National-Erie Corp., Erie, Pa.
Reading Steel Casting Div. of American Chain & Cable Co. Inc., Reading, Pa.
West Steel Casting Co., 805 E. 70th St., Cleveland, O.
Youngstown Alloy Casting Corp., 103 E. Indianola Ave., Youngstown, O.

CASTINGS (Gray Iron, Alloy, or Semi-Steel)
American Engineering Co., 2484 Aramingo Ave., Philadelphia, Pa.
Bartlett-Hayward Div., The Koppers Co., Baltimore, Md.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
Columbia Steel Co., San Francisco, Calif.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn. 322 Vulcan St., Buffalo, N. Y.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh, Pa.
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National Alloy Steel Co., Blawnox, Pa.
Shenango Penn Mold Co., Dover, O.

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American Chain & Cable Co. Inc., Bridgeport, Conn.
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
Erie Malleable Iron Co., W. 12th & Cherry Sts., Erie, Pa.
Jamestown Malleable Iron Corp., 500-700 Tiffany Ave., Jamestown, N. Y.
Lake City Malleable Co., 5026 Lakeside Ave., Cleveland, O.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis, Ind.
Peoria Malleable Castings Co., Peoria, Ill.

CASTINGS (Manganese Steel)
Damascus Steel Casting Co., New Brighton, Pa.

CASTINGS (Steel) (*Also Stainless)
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Continental Roll & Steel Fdry. Co., E. Chicago, Ind.
Damascus Steel Casting Co., New Brighton, Pa.
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn. 322 Vulcan St., Buffalo, N. Y.
Koppers Co., Western Gas Div., Fort Wayne, Ind.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh, Pa.
*Midvale Co., The, Nicetown, Philadelphia, Pa.
National-Erie Corp., Erie, Pa.
National Roll & Foundry Co., The, Avonmore, Pa.
Ohio Steel Fdry. Co., Lima, O.
Oil Well Supply Co., Dallas, Texas.
Pittsburgh Rolls Corp., 41st and Willow Sts., Pittsburgh, Pa.
Standard Steel Works Co., Paschall P. O., Philadelphia, Pa.
Steel Founders' Society of America, 920 Midland Bldg., Cleveland, O.
Strong Steel Fdy. Co., Hertel & Norris Ave., Buffalo, N. Y.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Union Steel Casting Co., 62nd and Butler Sts., Pittsburgh, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.
West Steel Casting Co., 805 E. 70th St., Cleveland, O.

CASTINGS (Wear Resisting)
Meehanite Metal Corp., 311 Ross St., Pittsburgh, Pa.
Shenango Penn Mold Co., Dover, O.

CASTINGS (Worm and Gear Bronze)
Cadman, A. W., Mfg. Co., 28th and Smallman Sts., Pittsburgh, Pa.

CEMENT (Acid Proof)
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia, Pa.
Sauereisen Cements Co., Sharpsburg Sta., Pittsburgh, Pa.

CEMENT (High Temperature)
Carborundum Co., The, Perth Amboy, N. J.
Norton Company, Worcester, Mass.

CEMENT (Refractory, High Temperature)
Johns-Manville Corp., 22 E. 40th St., New York City.

CENTRAL STATION EQUIPMENT
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

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Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

CHAIN (Malleable)
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
Lake City Malleable Co., 5026 Lakeside Ave., Cleveland, O.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis, Ind.

CHAIN (Roller)
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
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American Chain & Cable Co. Inc., Bridgeport, Conn.

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Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
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CHAIN (Welded or Weldless)
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Hillside Fluor Spar Mines, 38 So. Dearborn St., Chicago, Ill.
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia, Pa.

FLUXES (Soldering, Welding & Tinning)
American Chemical Paint Co., Ambler, Pa.

FORGING BILLETS—See BILLETS

FORGING MACHINERY
Alliance Machine Co., The, Alliance, O.
Erie Foundry Co., Erie, Pa.
Industrial Brownhoist Corp., Bay City, Mich.
Morgan Engineering Co., The, Alliance, O.

FORGINGS (Brass, Bronze, Copper)
American Brass Co., The, 25 Broadway, New York City.
Bridgeport Brass Co., Bridgeport, Conn.
Titan Metal Mfg. Co., Bellefonte, Pa.

FORGINGS (Drop) (*Also Stainless)
*Atlas Drop Forge Co., Lansing, Mich.
*Bethlehem Steel Co., Bethlehem, Pa.
Kropp Forge Co., 5301 W. Roosevelt Blvd., Chicago, Ill.
Oil Well Supply Co., Dallas, Texas.

FORGINGS (Hollow Bored)
Atlas Drop Forge Co., Lansing, Mich.
Bay City Forge Co., W. 19th and Cranberry Sts., Erie, Pa.
Kropp Forge Co., 5301 W. Roosevelt Blvd., Chicago, Ill.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.

FORGINGS (Iron and Steel) (*Also Stainless)
*Atlas Drop Forge Co., Lansing, Mich.
Bay City Forge Co., W. 19th and Cranbery Sts., Erie, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Heppenstall Co., 47th & Hatfield Sts., Pittsburgh, Pa.
*Kropp Forge Co., 5301 W. Roosevelt Blvd., Chicago, Ill.
Mesta Machine Co., P. O. Box 1466, Pittsburgh, Pa.
*Midvale Co., The, Nicetown, Philadelphia, Pa.
*National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Oil Well Supply Co., Dallas, Texas.
Standard Steel Works Co., Paschall P. O., Philadelphia, Pa.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
*Vulcan Steam Forging Co., 220-250 Rano St., Buffalo, N. Y.

FORGINGS (Upset)
Atlas Drop Forge Co., Lansing, Mich.
Bethlehem Steel Co., Bethlehem, Pa.

FROGS AND SWITCHES
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.

FURNACE INSULATION—See INSULATION

FURNACES (Blast)
Brassert, H. A., & Co., 310 So. Michigan Ave., Chicago, Ill.
McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland, O.

FURNACES (Brazing)
American Gas Furnace Co., Elizabeth, N. J.
Hevi Duty Electric Co., 4100 W. Highland Blvd., Milwaukee, Wis.

FURNACES (Electric Heating)
Ajax Electrothermic Corp., Ajax Park, Trenton, N. J.
Electric Furnace Co., The, Salem, O.
General Electric Co., Schenectady, N. Y.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh, Pa.
Hevi Duty Electric Co., 4100 W. Highland Blvd., Milwaukee, Wis.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
Salem Engineering Co., 714 So. Broadway, Salem, O.

FURNACES (Electric Melting)
Ajax Electrothermic Corp., Ajax Park, Trenton, N. J.
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
General Electric Co., Schenectady, N. Y.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.

FURNACES (Forging)
Ajax Electrothermic Corp., Ajax Park, Trenton, N. J.
American Gas Furnace Co., Elizabeth, N. J.
Electric Furnace Co., The, Salem, O.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh, Pa.
Pennsylvania Industrial Engineers, 2413 W. Magnolia St., Pittsburgh, Pa.
Salem Engineering Co., 714 So. Broadway, Salem, O.
Stewart Furnace Div., Chicago Flexible Shaft Co., 1106 So. Central Ave., Chicago, Ill.
Surface Combustion Corp., 2375 Dorr St., Toledo, O.

FURNACES (Galvanizing)
Salem Engineering Co., 714 So. Broadway, Salem, O.
Stewart Furnace Div., Chicago Flexible Shaft Co., 1106 So. Central Ave., Chicago, Ill.

FURNACES (Gas or Oil)
American Gas Furnace Co., Elizabeth, N. J.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh, Pa.
Pennsylvania Industrial Engineers, 2413 W. Magnolia St., Pittsburgh, Pa.
Salem Engineering Co., 714 So. Broadway, Salem, O.
Stewart Furnace Div., Chicago Flexible Shaft Co., 1106 So. Central Ave., Chicago, Ill.
Surface Combustion Corp., 2375 Dorr St., Toledo, O.

FURNACES (Heat Treating, Annealing, Carburizing, Hardening, Tempering)
Ajax Electrothermic Corp., Ajax Park, Trenton, N. J.
American Gas Furnace Co., Elizabeth, N. J.
Carborundum Co., The, Perth Amboy, N. J.
Electric Furnace Co., The, Salem, O.
General Electric Co., Schenectady, N. Y.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh, Pa.
Hevi Duty Electric Co., 4100 W. Highland Blvd., Milwaukee, Wis.
Kemp, C. M., Mfg. Co., 405 E. Oliver St., Baltimore, Md. Greenfield, Mass.
Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.
Pennsylvania Industrial Engineers, 2413 W. Magnolia St., Pittsburgh, Pa.
Salem Engineering Co., 714 So. Broadway, Salem, O.
Stewart Furnace Div., Chicago Flexible Shaft Co., 1106 So. Central Ave., Chicago, Ill.
Surface Combustion Corp., 2375 Dorr St., Toledo, O.
Wean Engineering Co., Warren, O.
Wilson, Lee, Engineering Co., 1370 Blount St., Cleveland, O.

FURNACES (Laboratory)
Ajax Electrothermic Corp., Ajax Park, Trenton, N. J.
American Gas Furnace Co., Elizabeth, N. J.
Hevi Duty Electric Co., 4100 W. Highland Blvd., Milwaukee, Wis.

FURNACES (Non-Ferrous Melting)
Ajax Electrothermic Corp., Ajax Park, Trenton, N. J.
American Gas Furnace Co., Elizabeth, N. J.

FURNACES (Open Hearth)
Brassert, H. A., & Co., 310 S. Michigan Ave., Chicago, Ill.
Criswell, James, Co., Keenan Bldg., Pittsburgh, Pa.
Lindemuth, Lewis B., 134 E. 47th St., New York City.

FURNACES (Recuperative)
Electric Furnace Co., The, Salem, O.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh, Pa.
Salem Engineering Co., 714 So. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo, O.

FURNACES (Rivet Heating)
Ajax Electrothermic Corp., Ajax Park, Trenton, N. J.
American Gas Furnace Co., Elizabeth, N. J.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh, Pa.
Salem Engineering Co., Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo, O.

FURNACES (Sheet and Tin Mill)
Aetna-Standard Engineering Co., The, Youngstown, O.
Electric Furnace Co., The, Salem, O.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh, Pa.
Kemp, C. M., Mfg. Co., 405 E. Oliver St., Baltimore, Md.
Pennsylvania Industrial Engineers, 2413 W. Magnolia St., Pittsburgh, Pa.
Salem Engineering Co., 714 So. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo, O.
Wean Engineering Co., Warren, O.
Wilson, Lee, Engineering Co., 1370 Blount St., Cleveland, O.

FURNACES (Steel Mill)
Ajax Electrothermic Corp., Ajax Park, Trenton, N. J.
Criswell, James, Co., Keenan Bldg., Pittsburgh, Pa.
Electric Furnace Co., The, Salem, O.
General Electric Co., Schenectady, N. Y.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh, Pa.
Kemp, C. M., Mfg. Co., 405 E. Oliver St., Baltimore, Md
Pennsylvania Industrial Engineers, 2413 W. Magnolia St., Pittsburgh, Pa.
Salem Engineering Co., 714 So. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo, O.
Wilson, Lee, Engineering Co., 1370 Blount St., Cleveland, O.

FURNITURE (Tubular Steel)
Wallace Supplies Mfg. Co., 1304 Diversey Parkway, Chicago, Ill.

GAGES
Greenfield Tap & Die Corp., Greenfield, Mass.

GALVANIZING (Hot Dip)
Acme Galvanizing, Inc., Milwaukee, Wis.
Acme Steel & Malleable Iron Works, Buffalo, N. Y.
American Hot Dip Galvanizers Asso., Inc., 903 American Bank Bldg., Pittsburgh, Pa.
American Tinning & Galvanizing Co., Erie, Pa.
Buffalo Galvanizing & Tinning Works, Inc., Buffalo, N. Y.
Cattie, Jos. P., & Bros., Gaul and Liberty Sts., Philadelphia, Pa.
Chain Products Co., The, Cleveland, O.
Diamond Expansion Bolt Co., Inc., Garwood, N. J.
Enterprise Galvanizing Co., 2525 E. Cumberland St., Philadelphia, Pa.
Thomas Gregory Galvanizing Works, Maspeth, N. Y.
Hanlon-Gregory Galvanizing Co., Pittsburgh, Pa.
Joslyn Mfg. & Supply Co., Chicago, Ill.
Koven, L. O., & Bro., Inc., Jersey City, N. J.
Lehigh Structural Steel Co., Allentown, Pa.
Missouri Rolling Mill Corp., St. Louis, Mo.
National Telephone Supply Co., The, Cleveland, O.
Penn Galvanizing Co., Philadelphia, Pa.
Riverside Foundry & Galvanizing Co., Kalamazoo, Mich.
Standard Galvanizing Co., Chicago, Ill.
Wilcox, Crittenden & Co., Inc., Middletown, Conn.
Witt Cornice Co., The, Cincinnati, O.

GALVANIZING PLANTS FOR SHEETS
Aetna-Standard Engineering Co., The, Youngstown, O.
Erie Foundry Co., Erie, Pa.
Wean Engineering Co., Warren, O.

GAS (Detarring)
Research Corp., 405 Lexington Ave., New York City.
Western Precipitation Corp., 1016 W. 9th St., Los Angeles, Calif.

GAS HOLDERS
Bartlett-Hayward Div., The Koppers Co., Baltimore, Md.
Bethlehem Steel Co., Bethlehem, Pa.
Western Gas Div., The Koppers Co., Fort Wayne, Ind.

GAS PRODUCERS PLANTS
Koppers Co., Engineering and Construction Div., 100 Koppers Bldg., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
Wood, R. D., Co., 400 Chestnut St., Philadelphia, Pa.

GAS RECOVERY COKE OVEN AND GAS PLANTS
Bartlett-Hayward Div., The Koppers Co., Baltimore, Md.
Koppers Co., Engineering and Construction Div., 100 Koppers Bldg., Pittsburgh, Pa.
Research Corp., 405 Lexington Ave., New York City.
Western Precipitation Corp., 1016 W. 9th St., Los Angeles, Calif.
Wilputte Coke Oven Corp., 570 Lexington Ave., New York City.

GAS SCRUBBERS
Bartlett-Hayward Div., The Koppers Co., Baltimore, Md.
Brassert, H. A., & Co., 310 So. Michigan Ave., Chicago, Ill.
Peabody Engineering Corp., 580 Fifth Ave., New York City.
Research Corp., 405 Lexington Ave., New York City.
Western Gas Div., Koppers Co., Fort Wayne, Ind.
Western Precipitation Corp., 1016 W. 9th St., Los Angeles, Calif.

GASKETS (Asbestos, Metal or Rubber)
American Hard Rubber Co., 11 Mercer St., New York City.
Johns-Manville Corp., 22 E. 40th St., New York City.

GAGES (Draft)
Peabody Engineering Corp., 580 Fifth Ave., New York City.

GAUGES (Indicating and Recording)
General Electric Co., Schenectady, N. Y.

GEAR BLANKS
Bay City Forge Co., W. 19th and Cranberry Sts., Erie, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Foote Bros. Gear & Machine Corp., 5311 S. Western Ave., Chicago, Ill.
King Fifth Wheel Co., 5027 Beaumont Ave., Philadelphia, Pa.
National-Erie Corp., Erie, Pa.
Standard Steel Works Co., Paschall P. O., Philadelphia, Pa.
Vulcan Steam Forging Co., 220-250 Rano St., Buffalo, N. Y.
Waldron, John, Corp., New Brunswick, N. J.

GEAR MACHINERY (Generating)
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn. 322 Vulcan St., Buffalo, N. Y.

GEAR MACHINERY (Lapping, Finishing, Checking)
Michigan Tool Co., 7171 E. McNichols Rd., Detroit, Mich.

GEARS (Non-Metallic)
Chicago Rawhide Mfg. Co., 1308 Elston Ave., Chicago, Ill.

GEARS (Spur, Bevel, Miter)
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn. 322 Vulcan St., Buffalo, N. Y.
Foote Bros. Gear & Machine Corp., 5311 S. Western Ave., Chicago, Ill.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland, O.
Jones, W. A., Fdry. & Mach. Co., 4437 W. Roosevelt Rd., Chicago, Ill.
National-Erie Corp., Erie, Pa.
Simonds Gear & Mfg. Co., The, 2501 Liberty St., Pittsburgh, Pa.

GEARS (Steel Laminated)
Waldron, John, Corp., New Brunswick, N. J.

GEARS (Worm)
Cleveland Worm & Gear Co., 3280 E. 80th St., Cleveland, O.
Foote Bros. Gear & Machine Corp., 5311 S. Western Ave., Chicago, Ill.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland, O.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit, Mich.
Simonds Gear & Mfg. Co., The, 2501 Liberty St., Pittsburgh, Pa.

GEARS AND GEAR CUTTING
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn. 322 Vulcan St., Buffalo, N. Y.
Foote Bros. Gear & Machine Corp., 5311 S. Western Ave., Chicago, Ill.
General Electric Co., Schenectady, N. Y.
Grant Gear Works, 2nd and B Sts., Boston, Mass.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland, O.
James, D. O., Mfg. Co., 1116 W. Monroe St., Chicago, Ill.
Lewis Foundry & Machine Co., P. O. Box 1586, Pittsburgh, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh, Pa.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit, Mich.
National-Erie Corp., Erie, Pa.
Simonds Gear & Mfg. Co., 2501 Liberty Ave., Pittsburgh, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.

GENERATING SETS
Fairbanks, Morse & Co., Dept. 96, 600 So. Wabash Ave., Chicago, Ill.
General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Reliance Electric & Mfg. Co., 1081 Ivanhoe Rd., Cleveland, O.

GENERATORS (Acetylene—Portable and Stationary)
Linde Air Products Co., The, 30 E. 42nd St., New York City.

GENERATORS (Electric)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Chicago Electric Co., 122 W. 22nd St., Chicago, Ill.
General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Lincoln Electric Co., The, Cleveland, O., Dept. Y-647.
Reliance Electric & Mfg. Co., 1081 Ivanhoe Rd., Cleveland, O.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

GRABS — FOR SHEETS, COILS, INGOTS
J-B Engineering Sales Co., 1743 Orange St., New Haven, Conn.

GRATING
Blaw-Knox Co., Blawnox, Pa.
Dravo Corp. (Machinery Div.), 300 Penn Ave., Pittsburgh, Pa.
Tri-Lok Co., 5515 Butler St., Pittsburgh, Pa.

GREASE (Lubricating—See LUBRICANTS (Industrial)

GREASE RETAINERS AND SEALS
Chicago Rawhide Mfg. Co., 1308 Elston Ave., Chicago, Ill

GRINDERS (Pedestal, High Speed)
Sawyer Electrical Mfg. Co., 5715 Leneve St., Los Angeles Cal.

GRINDERS (Portable—Pneumatic)
Ingersoll-Rand Co., 11 Broadway, New York City.

GRINDERS (Precision Thread)
Jones & Lamson Machine Co., Springfield, Vt.

GRINDERS (Single Slide Internal)
Bryant Chucking Grinder Co., Springfield, Vt.

GRINDERS (Surface)
Heald Machine Co., Worcester, Mass.

GRINDING COMPOUNDS
Houghton, E. F., & Co., 240 W. Somerset St., Philadelphia, Pa.
Sun Oil Co., 1608 Walnut St., Philadelphia, Pa.

GRINDING MACHINES (Automotive Reconditioning)
Heald Machine Co., Worcester, Mass.
Landis Tool Company, Waynesboro, Pa.

GRINDING MACHINES (Centerless, Internal and External)
Cincinnati Milling Machine Co., Oakley Sta., Cincinnati, O.
Heald Machine Co., Worcester, Mass.

GRINDING MACHINES (Chucking)
Cincinnati Milling Machine Co., Oakley Sta., Cincinnati, O.
Heald Machine Co., Worcester, Mass.
Landis Tool Company, Waynesboro, Pa.

GRINDING MACHINES (Crank Pin, Cam, Piston, Valve Face)
Cincinnati Milling Machine Co., Oakley Sta., Cincinnati, O.
Landis Tool Company, Waynesboro, Pa.

GRINDING MACHINES (Oscillating)
Cincinnati Milling Machine Co., Oakley Sta., Cincinnati, O.
Landis Tool Company, Waynesboro, Pa.

GRINDING MACHINES (Plain and Universal)
Cincinnati Milling Machine Co., Oakley Sta., Cincinnati, O.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester, Mass.

GRINDING MACHINES (Roll)
Cincinnati Milling Machine Co., Oakley Sta., Cincinnati, O.
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn.
322 Vulcan St., Buffalo, N. Y.
Landis Tool Co., Waynesboro, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh, Pa.
Norton Co., Worcester, Mass.

GRINDING MACHINES (Rotary Surface)
Blanchard Machine Co., Cambridge, Mass.
Heald Machine Co., Worcester, Mass.

GRINDING MACHINES (Swing Frame)
Excelsior Tool & Machine Co., Ridge and Jefferson Aves., East St. Louis, Ill.

GRINDING MACHINES (Tool and Cutter)
Cincinnati Milling Machine Co., Oakley Sta., Cincinnati, O.
Kearney & Trecker Corp., 5926 National Ave., Milwaukee, Wis.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester, Mass.

GRINDING (Shear Knife)
American Shear Knife Co., 3rd & Ann Sts., Homestead, Pa.

GRINDING WHEELS
Abrasive Co., Taconey & Fraley Sts., Philadelphia, Pa.
Blanchard Machine Co., Cambridge, Mass.
Carborundum Co., The, Niagara Falls, N. Y.
Norton Co., Worcester, Mass.

GRINDING WHEELS (Segment)
Blanchard Machine Co., Cambridge, Mass.

GUIDE SHOES
Youngstown Alloy Casting Corp., 103 E. Indianola Ave., Youngstown, O.

GUIDES (Mill)
National-Erie Corp., Erie, Pa.

GUNS (Blast Furnace Mud)
Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh, Pa.
Brosius, Edgar E., Inc., Sharpsburg, Pa.

GUNS (Steam, Hydraulic, Electric)
Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh, Pa.
Brosius, Edgar E., Inc., Sharpsburg, Pa.

HACK SAWS
Simonds Saw & Steel Co., Fitchburg, Mass.

HAMMERS (Chipping, Riveting, Caiking)
Ingersoll-Rand Co., 11 Broadway, New York City.

HAMMERS (Drop)
Alliance Machine Co., The, Alliance, O.
Chambersburg Engineering Co., Chambersburg, Pa.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn.
322 Vulcan St., Buffalo, N. Y.
Industrial Brownhoist Corp., Bay City, Mich.
Morgan Engineering Co., The, Alliance, O.

HAMMERS (Steam)
Alliance Machine Co., The, Alliance, O.
Chambersburg Engineering Co., Chambersburg, Pa.
Erie Foundry Co., Erie, Pa.
Industrial Brownhoist Corp., Bay City, Mich.
Morgan Engineering Co., The. Alliance, O.

HANGERS
Ahlberg Bearing Co., 3015 W. 47th St., Chicago, Ill.
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia, Pa.

HANGERS (Shaft)
Bantam Bearings Corp., South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Bearings Division, General Motors Corp., Harrison, N. J.
New Departure Div., General Motors Corp., Bristol, Conn.
Shafer Bearing Corp., 35 E. Wacker Drive, Chicago, Ill.
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia, Pa.

HARDENING—See Case HARDENING

HARDWARE SPECIALTIES
Budd, Edw. G., Mfg. Co., 25th St. & Huntington Park Ave., Philadelphia, Pa.
Peoria Malleable Castings Co., Peoria, Ill.

HEAT TREATING MATERIALS
Houghton, E. F., & Co., 240 W. Somerset St., Philadelphia, Pa.
Sauereisen Cements Co., Sharpsburg Sta., Pittsburgh, Pa.

HEATERS (Air)
Babcock & Wilcox Co., The, 19 Rector St., New York City
Maehler, Paul, Co., The, 2200 W. Lake St., Chicago, Ill.

Heaters (Oven)
Maehler, Paul, Co., The, 2200 W. Lake St., Chicago, Ill.

HEATERS (Unit)
Dravo Corp. (Machinery Div.), 300 Penn Ave., Pittsburgh, Pa.

HITCHINGS (Mine Car)
American Chain & Cable Co., Bridgeport, Conn.

HOBBING MACHINES
Barber Colman Co., 150 Loomis St., Rockford, Ill.

HOBS
Barber Colman Co., 150 Loomis St., Rockford, Ill.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit, Mich.

HOISTS (Chain)
Ford Chain Block Div. of American Chain & Cable Co., Inc., 2nd & Diamond Sts., Philadelphia, Pa.
Wright Mfg. Div. of American Chain & Cable Co. Inc., York, Pa.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa.
Cleveland, O., Dept. 20-9.

HOISTS (Electric)
American Engineering Co., 2484 Aramingo Ave., Philadelphia, Pa.
American MonoRail Co., The, 13102 Athens Ave., Cleveland, O.
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1125 Depot St., Wickliffe, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Industrial Brownhoist Corp., Bay City, Mich.
Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore, Inc., 406 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Wright Mfg. Div. of American Chain & Cable Co. Inc., York, Pa.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa.

HOISTS (Monorail)
American Engineering Co., 2484 Aramingo Ave., Philadelphia, Pa.
American MonoRail Co., The, 13102 Athens Ave., Cleveland, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1125 Depot St., Wickliffe, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore, Inc., 406 Broadway, Muskegon, Mich.
Shepard-Niles Crane & Hoist Corp., Montour Falls, N. Y.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa.

HOISTS (Pneumatic)
Curtis Pneumatic Machinery Co., 1996 Kienlen Ave., St. Louis, Mo.
Ingersoll-Rand Co., 11 Broadway, New York City.

HOOKS (Chain)
American Chain & Cable Co., Bridgeport, Conn.

HOOPS AND BANDS
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell St., Chicago, Ill.
Stanley Works, The, New Britain, Conn. Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Youngstown Sheet & Tube Co., Youngstown, O.

HOSE (Flexible Metallic)
American Brass Co., The, American Metal Hose Branch, Waterbury, Conn.

HOSE (Rubber)
Goodyear Tire & Rubber Co., Akron, O.
United States Rubber Co., 1790 Broadway, New York City.

HYDRAULIC MACHINERY
Alliance Machine Co., The, Alliance, O.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Bethlehem Steel Co., Bethlehem, Pa.
Chambersburg Engineering Co., Chambersburg, Pa.
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn.
322 Vulcan St., Buffalo, N. Y.
Hannifin Mfg. Co., 621-631 So. Kolmar Ave., Chicago, Ill.
Morgan Engineering Co., The, Alliance, O.
National-Erie Corp., Erie, Pa.
Schloemann Engineering Corp., Empire Bldg., Pittsburgh, Pa.
Wood, R. D., Co., 400 Chestnut St., Philadelphia, Pa.

HYDRAULIC PRESSES—See PRESSES (Hydraulic)

INDICATORS (Temperature)
American Gas Furnace Co., Elizabeth, N. J.
Brown Instrument Div. of Minneapolis Honeywell Regulator Co., 4462 Wayne Ave., Philadelphia, Pa.
Foxboro Co., The, 118 Neponset Ave., Foxboro, Mass.
Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.

INDICATORS (Blast Furnace Stock Line)
Brosius, Edgar E., Inc., Sharpsburg, Pa.

INGOT MOLDS
Bethlehem Steel Co., Bethlehem, Pa.
Shenango-Penn Mold Co., Oliver Bldg., Pittsburgh, Pa.
Valley Mould & Iron Co., Hubbard, O.

INHIBITORS
American Chemical Paint Co., Ambler, Pa.
Parkin, Wm. M., Co., The, 1005 Highland Bldg., Pittsburgh, Pa.

INJECTORS (Lead)
Dietzel Lead Burning Co., Coraopolis, Pa.

INSTRUMENTS (Electric Indicating and Recording)
Brown Instrument Div. of Minneapolis Honeywell Regulator Co., 4462 Wayne Ave., Philadelphia, Pa.
Foxboro Co., The, 118 Neponset Ave., Foxboro, Mass.
General Electric Co., Schenectady, N. Y.
Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.

INSULATING BLOCK
Armstrong Cork Products Co., 985 Concord St., Lancaster, Pa.
Johns-Manville Corp., 22 E. 40th St., New York City.

INSULATING BRICK
Armstrong Cork Products Co., 985 Concord St., Lancaster, Pa.
Johns-Manville Corp., 22 E. 40th St., New York City.

INSULATING POWDER AND CEMENT
Ajax Electrothermic Corp., Ajax Park, Trenton, N. J.
Armstrong Cork Products Co., 985 Concord St., Lancaster, Pa.
Babcock & Wilcox Co., The, 19 Rector St., New York City.

INSULATION (Furnace, Boiler Settings, Ovens, Steam Pipe, Etc.)
Armstrong Cork Products Co., 985 Concord St., Lancaster, Pa.
Johns-Manville Corp., 22 E. 40th St., New York City.

IRON (Bar)
Ryerson, Jos. T., & Son Co., 16th & Rockwell Sts., Chicago, Ill.

IRON ORE
Alan Wood Steel Co., Conshohocken, Pa.
Cleveland-Cliffs Iron Co., Union Commerce Bldg., Cleveland, O.
Hanna Furnace Corp., The, Ecorse, Detroit, Mich.
Shenango Furnace Co., Oliver Bldg., Pittsburgh, Pa.

WHERE-TO-BUY

Snyder, W. P., & Co., Oliver Bldg., Pittsburgh, Pa.
Youngstown Sheet & Tube Co., The, Youngstown, O.

JIGS AND FIXTURES
Columbus Die, Tool & Mach. Co., 955 Cleveland Ave., Columbus, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.

KEYS (Machine)
Moltrup Steel Products Co., Beaver Falls, Pa.

KEYS (Woodruff)
Moltrup Steel Products Co., Beaver Falls, Pa.

KNIVES (Rotary)
American Shear Knife Co., 3rd and Ann Sts., Homestead, Pa.
Cowles Tool Co., 2086 W. 110th St., Cleveland, O.

KNIVES (Shear, Solid Steel, Flying)
American Shear Knife Co., 3rd and Ann Sts., Homestead, Pa.

LABORATORY WARE
Norton Company, Worcester, Mass.

LACQUERS
Sipe, James B., & Co., Inc., So. Hills Branch, Pittsburgh, Pa.

LADLES
Hollands Mfg. Co., 342-352 E. 18th St., Erie, Pa.

LAMPS (Filaments)
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LAMPS (Mercury Vapor)
General Electric Co., Lamp Dept., Nela Park, Cleveland, O.

LAMPS (Neon Glow)
General Electric Co., Lamp Dept., Nela Park, Cleveland, O.

LAPPING MACHINES
Cincinnati Milling Machine Co., Oakley Sta., Cincinnati, O.

LARRIES (Coal)
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.

LATHES
LeBlond, R. K., Machine Tool Co., 2694 Madison Rd., Cincinnati, O.
Monarch Machine Tool Co., Sidney, O.

LATHES (Automatic)
Jones & Lamson Machine Co., Springfield, Vt.
Monarch Machine Tool Co., Sidney, O.

LATHES (Roll Turning)
Continental Roll & Steel Fdry. Co., E. Chicago, Ind.
Hyde Park Foundry & Machine Co., Hyde Park, Pa.
Lewis Fdry. & Mach. Co., P. O. Box 1586, Pittsburgh, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland, O.

LATHES (Turret)
Bullard Company, The, Bridgeport, Conn.
Jones & Lamson Machine Co., Springfield, Vt.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland, O.

LATHES (Turret) (Automatic Vertical)
Bullard Company, The, Bridgeport, Conn.

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LEAD (Tellurium)
National Lead Co., 111 Broadway, New York City.

LEAD WORK
Dietzel Lead Burning Co., Coraopolis, Pa.

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Erie Foundry Co., Erie, Pa.
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McKay Machine Co., Youngstown, O.
Mesta Machine Co., P. O. Box 1466, Pittsburgh, Pa.
Sutton Engineering Co., Park Bldg., Pittsburgh, Pa.
Voss, Edward W., 2882 W. Liberty Ave., Pittsburgh, Pa.
Wean Engineering Co., Warren, O.

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Wilputte Coke Oven Corp., 570 Lexington Ave., New York City.

LIFT TRUCKS—See TRUCKS (Lift)

LIFTING MAGNETS—See MAGNETS (Lifting)

LIGHTING (Industrial)
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LINERS (Pump and Cylinder)
Shenango-Penn Mold Co., Dover, O.

LOCOMOTIVE CRANES—See CRANES (Locomotive)

LOCOMOTIVES (Diesel-Electric)
Plymouth Locomotive Works, Plymouth, O.
Whitcomb Locomotive Co., Rochelle, Ill.

LOCOMOTIVES (Diesel Mechanical)
Plymouth Locomotive Works, Plymouth, O.
Whitcomb Locomotive Co., Rochelle, Ill.

LOCOMOTIVES (Electric Trolley)
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General Electric Co., Schenectady, N. Y.
Whitcomb Locomotive Co., Rochelle, Ill.

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General Electric Co., Schenectady, N. Y.
Whitcomb Locomotive Co., Rochelle, Ill.

LOCOMOTIVES (Gasoline Mechanical)
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Ingersoll-Rand Co., 11 Broadway, New York City.
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LOCOMOTIVES (Storage Battery)
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General Electric Co., Schenectady, N. Y.
Whitcomb Locomotive Co., Rochelle, Ill.

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Gulf Oil Corp. of Penna., Gulf Refining Co., 3800 Gulf Bldg., Pittsburgh, Pa.
Houghton, E. F., & Co., 240 W. Somerset St., Philadelphia, Pa.
New York & New Jersey Lubricant Co., 292 Madison Ave., New York City.
Penola, Inc., 34th & Smallman Sts., Pittsburgh, Pa.
Pure Oil Co., The, 35 E. Wacker Dr., Chicago, Ill.
Shell Oil Co., Inc., 50 W. 50th St., New York City.
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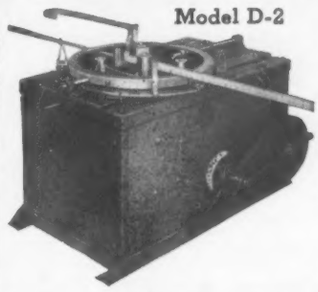

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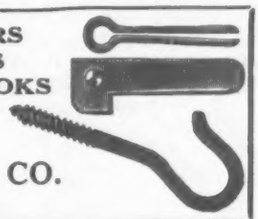

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National Roll & Fdry. Co., The, Avonmore, Pa.
Niagara Machine & Tool Works,
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Oil Well Supply Co., Dallas, Texas.
Shuster, F. B., Co., The, New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
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METAL STAMPINGS—See STAMPINGS

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MOLDS (Ingot)—See INGOT MOLDS

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Vanadium Corp. of America, 420 Lexington Ave., New York City.

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Cleveland Tramrail Div. of Cleveland Crane & Engineering Co.,
1125 Depot St., Wickliffe, O.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

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Fairbanks, Morse & Co., Dept. 96, 600 So. Wabash Ave., Chicago, Ill.
General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Lincoln Electric Co., The, Cleveland, O., Dept. Y-647.
Reliance Electric & Mfg. Co., 1081 Ivanhoe Rd., Cleveland, O.
Sawyer Electrical Mfg. Co., 5715 Leneve St., Los Angeles, Cal.
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.
Wagner Electric Corp., 6400 Plymouth Ave., St. Louis, Mo.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

MUCK BAR
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia, Pa.

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Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
*Pittsburgh Steel Co., 1653 Grant Bldg., Pittsburgh, Pa.
*Republic Steel Corp., Dept. ST, Cleveland, O.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Wickwire Brothers, 189 Main St., Cortland, N. Y.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York City.
Youngstown Sheet & Tube Co., The, Youngstown, O.

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NICKEL (All Commercial Forms)
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NICKEL (Shot)
International Nickel Co., Inc., The, 67 Wall St., New York City.

NICKEL STEEL (Cold Drawn)
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Republic Steel Co., Dept. ST, Cleveland, O.
Union Drawn Steel Co., Massillon, O.

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Bethlehem Steel Co., Bethlehem, Pa.
Cleveland Cap & Screw Co., 2934 E. 79th St., Cleveland, O.
*Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Tinnerman Stove & Range Co., 2039 Fulton Rd., Cleveland, O.

NUTS (Castellated)
Bethlehem Steel Co., Bethlehem, Pa.
Cleveland Cap Screw Co., 2934 E. 79th St., Cleveland, O.
National Acme Co., The, E. 131st St. & Colt Rd., Cleveland, O.
Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS (Cold Punched)
Bethlehem Steel Co., Bethlehem, Pa.
Cleveland Cap Screw Co., 2934 E. 79th St., Cleveland, O.
Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS (Hot Pressed)
Bethlehem Steel Co., Bethlehem, Pa.
Cleveland Cap Screw Co., 2934 E. 79th St., Cleveland, O.
Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland, O.
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NUTS (Semi-Finished)
Bethlehem Steel Co., Bethlehem, Pa.
Cleveland Cap Screw Co., 2934 E. 79th St., Cleveland, O.
Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS (Wing)
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OIL RETAINERS AND SEALS
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Houghton, E. F., & Co., 240 W. Somerset St., Philadelphia, Pa.
Penola, Inc., 34th & Smallman Sts., Pittsburgh, Pa.
Pure Oil Co., The, 35 E. Wacker Dr., Chicago, Ill.
Shell Oil Co., Inc., 50 W. 50th St., New York City.
Sipe, James B., & Co. Inc., So. Hills Branch, Pittsburgh, Pa.
Socony-Vacuum Oil Co., Inc., 26 Broadway, New York City.
Sun Oil Co., 1608 Walnut St., Philadelphia, Pa.
Tide Water Associated Oil Co., 17 Battery Place, New York City.

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Sipe, James B., & Co. Inc., So. Hills Branch, Pittsburgh, Pa.

OILS (Rust Preventive)
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Sipe, James B., & Co. Inc., So. Hills Branch, Pittsburgh, Pa.

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Maehler, Paul, Co., The, 2200 W. Lake St., Chicago, Ill.
Stewart Furnace Div., Chicago Flexible Shaft Co., 1106 So. Central Ave., Chicago, Ill.

OVENS (Coke, By-Product Recovery)
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OVENS (Core and Mold)
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Pennsylvania Industrial Engineers, 2413 W. Magnolia St., Pittsburgh, Pa.

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United States Rubber Co., 1790 Broadway, New York City.

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PAINT (Rust Preventive)
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Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia, Pa.

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Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia, Pa

PICKLING TANKS—See TANKS (Pickling)

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Youngstown Alloy Casting Corp., 103 E. Indianola Ave., Youngstown, O.

PIG IRON
Alan Wood Steel Co., Conshohocken, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Brooke, E. & G., Iron Co., Birdsboro, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Cleveland-Cliffs Iron Co., Union Commerce Bldg., Cleveland, O.
Hanna Furnace Corp., The, Ecorse, Detroit, Mich.
Jackson Iron & Steel Co., Jackson, O.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Samuel, Frank & Co., Inc., Harrison Bldg., Philadelphia, Pa.
Shenango Furnace Co., Oliver Bldg., Pittsburgh, Pa.
Snyder, W. P., & Co., Oliver Bldg., Pittsburgh, Pa.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Wisconsin Steel Co., 180 No. Michigan Ave., Chicago, Ill.

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Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Inland Steel Co., 38 South Dearborn St., Chicago, Ill.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Republic Steel Co., Dept. ST, Cleveland, O.

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Wood Preserving Corp., The, 100 Koppers Bldg., Pittsburgh, Pa.

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Link-Belt Co., 519 N. Holmes Ave., Indianapolis, Ind.
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322 Vulcan St., Buffalo, N. Y.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland, O.
National-Erie Corp., Erie, Pa.
Simonds Gear & Mfg. Co., The, 2501 Liberty St., Pittsburgh, Pa.
United Engineering & Foundry Co., First National Bank Bldg., Pittsburgh, Pa.

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American Rolling Mill Co., The, Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Crane Co., The, 836 So. Michigan Blvd., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Western Gas Div., The Koppers Co., Fort Wayne, Ind.
Youngstown Sheet & Tube Co., The, Youngstown, O.

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Worthington Pump & Machy. Corp., Harrison, N. J.

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Aetna-Standard Engineering Co., The, Youngstown, O.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.

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PIPE TOOLS
Greenfield Tap & Die Corp., Greenfield, Mass.
Hollands Mfg. Co., 342-352 E. 18th St., Erie, Pa.

PIPING CONTRACTORS
Power Piping Co., Beaver and Western Ave., Pittsburgh, Pa.

PISTON RINGS
American Hammered Piston Ring Div., The Koppers Co., Baltimore, Md.

PISTON RODS
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
Bay City Forge Co., W. 19th and Cranberry Sts., Erie, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Heppenstall Co., 47th and Hatfield Sts., Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Kropp Forge Co., 5301 W. Roosevelt Blvd., Chicago, Ill.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Standard Steel Works Co., Paschall P. O., Philadelphia, Pa.
Union Drawn Steel Co., Massillon, O.

PLANERS AND SHAPERS
Cincinnati Shaper Co., Elam and Garrard Sts., Cincinnati, O.
Cleveland Punch & Shear Works, 3917 St. Clair Ave., Cleveland, O.

PLATE CASTORS
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.

PLATES (Sheared or Universal) (*Also Stainless)
*Alan Wood Steel Co., Conshohocken, Pa.
*Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
*American Rolling Mill Co., Middletown, O.
*Bethlehem Steel Co., Bethlehem, Pa.
*Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Enterprise Galvanizing Co., 2525 E. Cumberland St., Philadelphia, Pa.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jessop Steel Co., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
*Republic Steel Corp., Dept. ST, Cleveland, O.
*Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Wisconsin Steel Co., 180 No. Michigan Ave., Chicago, Ill.
Worth Steel Co., Claymont, Del.
Youngstown Sheet & Tube Co., The, Youngstown, O.

PLATES (Stainless Clad)
Granite City Steel Co., Granite City, Ill.
Jessop Steel Co., Washington, Pa.

PLATES (Steel—Floor)—See FLOORING (Steel)

PLATES (Terne and Tin)—See TIN PLATE

PLUGS (Expansion)
Hubbard, M. D., Spring Co., 613 Central Ave., Pontiac, Mich.

PLUGS (Rolling Mill)
Youngstown Alloy Casting Corp., 103 E. Indianola Ave., Youngstown, O.

POLES (Tubular Steel)
National Tube Co., Frick Bldg., Pittsburgh, Pa.

POLISHING MACHINERY (Tube and Bar)
Medart Co., The, 3520 de Kalb St., St. Louis, Mo.

POLISHING MACHINES, AUTOMATIC (Stainless Steel)
Excelsior Tool & Machine Co., Ridge and Jefferson Aves., East St. Louis, Ill.

POTS (Case Hardening)
Pressed Steel Tank Co., 1461 So. 66th St., Milwaukee, Wis.

POTS (Melting)
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn. 322 Vulcan St., Buffalo, N. Y.
Hollands Mfg. Co., 342-352 E. 18th St., Erie, Pa.
Kemp, C. M., Mfg. Co., 405 E. Oliver St., Baltimore, Md.

POWER UNITS (Gasoline, Electric for Industrial Trucks)
Ready Power Co., 3826 Grand River Ave., Detroit, Mich.

PRECIPITATORS (Cottrell Electric)
Research Corp., 405 Lexington Ave., New York City.
Western Precipitation Corp., 1016 W. 9th St., Los Angeles, Calif.

PREHEATERS
Babcock & Wilcox Co., The, 19 Rector St., New York City.

PRESSED METAL PARTS
Stanley Works, The, Pressed Metal Div., New Britain, Conn.

PRESSES
Cleveland Punch & Shear Works, 3917 St. Clair Ave., Cleveland, O.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn. 322 Vulcan St., Buffalo, N. Y.
Logeman Brothers Co., 3126 Burleigh St., Milwaukee, Wis.
Niagara Machine & Tool Works, 637 Northland Ave., Buffalo, N. Y.
Tomkins-Johnson Co., 611 N. Mechanics St., Jackson, Mich.

PRESSES (Forging)
Erie Foundry Co., Erie, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh, Pa.
Morgan Engineering Co., Alliance, O.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.

PRESSES (Forming and Braking)
Cincinnati Shaper Co., Elam and Garrard Sts., Cincinnati, O.

PRESSES (Hydraulic)
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Chambersburg Engineering Co., Chambersburg, Pa.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn. 322 Vulcan St., Buffalo, N. Y.
Hannifin Mfg. Co., 621-631 So. Kolmar Ave., Chicago, Ill.
Logeman Brothers Co., 3126 Burleigh St., Milwaukee, Wis.
Mesta Machine Co., P. O. Box 1466, Pittsburgh, Pa.
Morgan Engineering Co., The, Alliance, O.
National-Erie Corp., Erie, Pa.
Schloemann Engineering Corp., Empire Bldg., Pittsburgh, Pa.
Wood, R. D., Co., 400 Chestnut St., Philadelphia, Pa.

PRESSES (Punching, Drawing, Coining, Blanking, etc.)
Cleveland Punch & Shear Works, The, 3917 St. Clair Ave., Cleveland, O.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo, N. Y.

PRESSES (Riveting)
Hannifin Mfg. Co., 621-631 So. Kolmar Ave., Chicago, Ill.

PRESSES (Scrap Bundling and Baling)
Logeman Brothers Co., 3126 Burleigh St., Milwaukee, Wis.

PRESSES (Welding)—See WELDERS

PRESSURE VESSELS
Babcock & Wilcox Co., The, 19 Rector St., New York City.

PRODUCER GAS SYSTEMS—See GAS PRODUCER PLANTS

PUG MILLS (For Blast Furnaces and Sintering Plants)
Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh, Pa.

PULVERIZERS
American Pulverizer Co., 1249 Macklind Ave., St. Louis, Mo.

PUMP HOUSES
Dravo Corp. (Contracting Div.), Neville Island, Pittsburgh, Pa.

PUMPS
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Hard Rubber Co., 11 Mercer St., New York City.
Mesta Machine Co., P. O. Box 1466, Pittsburgh, Pa.
Oil Well Supply Co., Dallas, Texas.

PUMPS (Boiler Feed)
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS (Centrifugal)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Hard Rubber Co., 11 Mercer St., New York City
Fairbanks, Morse & Co., Dept. 96, 600 So. Wabash Ave., Chicago, Ill.
Ingersoll-Rand Co., 11 Broadway, New York City.
Tomkins-Johnson Co., 611 N. Mechanics St., Jackson, Mich.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS (Hydraulic)
Hydro-Power Systems, Inc., Mt. Gilead, O.
Logeman Brothers Co., 3126 Burleigh St., Milwaukee, Wis.
Wood, R. D., Co., 400 Chestnut St., Philadelphia, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS (Rotary)
Roper, Geo. D., Co., Rockford, Ill.

PUMPS (Vacuum)
Ingersoll-Rand Co., 11 Broadway, New York City.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUNCHES (Multiple)
Cincinnati Shaper Co., Elam and Garrard Sts., Cincinnati, O.
Cleveland Punch & Shear Works, The, 3917 St. Clair Ave., Cleveland, O.

PUNCHING AND SHEARING MACHINERY
Beatty Machine & Mfg. Co., Hammond, Ind.
Chambersburg Engineering Co., Chambersburg, Pa.
Cleveland Punch & Shear Works, 3917 St. Clair Ave., Cleveland, O.
Continental Roll & Steel Fdry. Co., E. Chicago, Ind.
Lewis Foundry & Machine Co., P. O. Box 1586, Pittsburgh, Pa.
Morgan Engineering Co., The, Alliance, O.
Niagara Machine & Tool Works, 637 Northland Ave., Buffalo, N. Y.
Thomas Machine Mfg. Co., Pittsburgh, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.

PYROMETER TUBES
Norton Company, Worcester, Mass.

PYROMETERS
American Gas Furnace Co., Elizabeth, N. J.
Brown Instrument Div. of Minneapolis Honeywell Regulator Co., 4462 Wayne Ave., Philadelphia, Pa.
Foxboro Co., The, 118 Neponset Ave., Foxboro, Mass.
Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.

RAIL BREAKERS
National Roll & Foundry Co., The, Avonmore, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.

RAILS (New and Relaying)
Foster, L. B., Co., Inc., P. O. Box 1647, Pittsburgh, Pa.

RAILS (Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.

REAMERS
Barber Colman Co., 150 Loomis St., Rockford, Ill.
Blanchard Machine Co., Cambridge, Mass.
Brown & Sharpe Mfg. Co., Providence, R. I.
Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland, O.
Greenfield Tap & Die Corp., Greenfield, Mass.

REAMERS (Pneumatic)
Ingersoll-Rand Co., 11 Broadway, New York City.

REAMERS (Sand, Ingot Mold—Pneumatic)
Ingersoll-Rand Co., 11 Broadway, New York City.

REBUILT EQUIPMENT
Marr-Galbreath Machinery Co., 53 Water St., Pittsburgh, Pa.
West Penn Machinery Co., 1208 House Bldg., Pittsburgh, Pa

RECEIVERS
Pressed Steel Tank Co., Milwaukee, Wis.

RECORDERS (Combustion)
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.

RECORDERS (Pressure, Speed, Temperature, Time)
Brown Instrument Div. of Minneapolis Honeywell Regulator Co., 4462 Wayne Ave., Philadelphia, Pa.
Foxboro Co., The, 118 Neponset Ave., Foxboro, Mass.
Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.

REDUCERS (Speed)—See SPEED REDUCERS

REDUCTION GEARS
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn. 322 Vulcan St., Buffalo, N. Y.
Foote Bros. Gear & Machine Corp., 5311 S. Western Ave., Chicago, Ill.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland, O.
National-Erie Corp., Erie, Pa.
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.

REFRACTORIES (Fire Clay)
Babcock & Wilcox Co., The, 19 Rector St., New York City.
Eureka Fire Brick Co., 1100 B. F. Jones Law Bldg., Pittsburgh, Pa
Keagler Brick Co., 1443 W. Market St., Steubenville, O.

REFRACTORIES (For High Frequency Furnaces)
Ajax Electrothermic Corp., Ajax Park, Trenton, N. J.
Carborundum Co., The, Perth Amboy, N. J.

REFRACTORIES (Silicon Carbide)
Carborundum Co., The, Perth Amboy, N. J.
Norton Co., Worcester, Mass.

REGULATORS (Pressure)
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.

REGULATORS (Temperature)
Brown Instrument Div. of Minneapolis Honeywell Regulator Co., 4462 Wayne Ave., Philadelphia, Pa.
Foxboro Co., The, 118 Neponset Ave., Foxboro, Mass.
Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.

REINFORCEMENT FABRIC (Electric Welded)
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Columbia Steel Co., San Francisco, Calif.
Wickwire Spencer Steel Co., 41 E. 42nd St., New York City.

RESISTORS (Edgewound)
Clark Controller Co., The, 1146 E. 152nd St., Cleveland, O.

RESISTORS (Graphite Disc)
Allen-Bradley Co., 1320 So. 2nd St., Milwaukee, Wis.

RHEOSTATS (Plating)
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.

RINGS (Steel)
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
Bay City Forge Co., W. 19th and Cranberry Sts., Erie, Pa.
Heppenstall Co., 47th & Hatfield Sts., Pittsburgh, Pa.
King Fifth Wheel Co., 5027 Beaumont Ave., Philadelphia, Pa.
Kropp Forge Co., 5301 W. Roosevelt Blvd., Chicago, Ill.
Moltrup Steel Products Co., Beaver Falls, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Standard Steel Works Co., Paschall P. O., Philadelphia, Pa.
Vulcan Steam Forging Co., 220-250 Rano St., Buffalo, N. Y.

RINGS (Welded Steel)
King Fifth Wheel Co., 5027 Beaumont Ave., Philadelphia, Pa.

RINGS (Weldless) (*Also Stainless)
*Midvale Co., The, Nicetown, Philadelphia, Pa.
*Vulcan Steam Forging Co., 220-250 Rano St., Buffalo, N. Y.

RIVETERS (Hydraulic—Portable and Stationary)
Hannifin Mfg. Co., 621-631 So. Kolmar Ave., Chicago, Ill.

RIVETERS (Jam, Pedestal, Staybolt, Squeeze, Stationary, Yoke—Pneumatic)
Ingersoll-Rand Co., 11 Broadway, New York City.

RIVETERS (Pneumatic)
Hannifin Mfg. Co., 621-631 So. Kolmar Ave., Chicago, Ill.

RIVETING MACHINERY
Chambersburg Engineering Co., Chambersburg, Pa.
Shuster, F. B., Co., The, New Haven, Conn.
Tomkins-Johnson Co., 611 N. Mechanics St., Jackson, Mich.
Wood, R. D., Co., 400 Chestnut St., Philadelphia, Pa.

RIVETS (*Also Stainless)
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Champion Rivet Co., The, Harvard Ave. at E. 108th St., Cleveland, O.
Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.
Progressive Mfg. Co., Torrington, Conn.
*Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland, O.
*Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, Pa.

RODS (Brass, Bronze, Copper, Nickel Silver, Silicon-Bronze)
American Brass Co., The, 25 Broadway, New York City.
Bridgeport Brass Co., Bridgeport, Conn.

RODS (Drill)
Firth-Sterling Steel Co., McKeesport, Pa.
Fitzsimons Co., The, 1623 Wilson Ave., Youngstown, O.
Kidd Drawn Steel Co., Aliquippa, Pa.
Monarch Steel Co., McCarty and Sand Sts., Indianapolis, Ind.

RODS (Piston)
Vulcan Steam Forging Co., 220-250 Rano St., Buffalo, N. Y.

RODS (Rounds, Flats and Shapes) (*Also Stainless)
*American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
*Firth-Sterling Steel Co., McKeesport, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
*Republic Steel Corp., Dept. St., Cleveland, O.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Timken Steel & Tube Co., Canton, O.
Titan Metal Mfg. Co., Bellefonte, Pa.
Washburn Wire Co., Phillipsdale, R. I.
Youngstown Sheet & Tube Co., Youngstown, O.

RODS (Steel and Iron)
Firth-Sterling Steel Co., McKeesport, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.

RODS (Welding)—See WELDING RODS

RODS (Wire)—See WIRE PRODUCTS

ROLL COOLERS (Internal, Water)
Hunt, C. B., & Son, Salem, O.

ROLLER LEVELERS (Backed-up)
Voss, Edward W., 2882 W. Liberty Ave., Pittsburgh, Pa.

ROLLERS (Rubber)
Goodyear Tire & Rubber Co., Akron, O.

ROLLING DOORS & SHUTTERS—SEE DOORS & SHUTTERS

ROLLING MILL BEARINGS—See BEARINGS (Rolling Mill)

ROLLING MILL EQUIPMENT
Aetna Standard Engineering Co., The, Youngstown, O.
Alliance Machine Co., The, Alliance, O.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Continental Roll & Steel Fdry. Co., E. Chicago, Ind.
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn. 322 Vulcan St., Buffalo, N. Y.
Hyde Park Fdry. & Mach. Co., Hyde Park, Pa.
Lewis Fdry. & Mach. Co., P. O. Box 1586, Pittsburgh, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
Morgan Engineering Co., The, Alliance, O.
National Roll & Foundry Co., The, Avonmore, Pa.
Schloemann Engineering Corp. Empire Bldg., Pittsburgh, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.
Voss, Edward W., 2882 W. Liberty Ave., Pittsburgh, Pa.
Wean Engineering Co., Warren, O.

ROLLING MILLS (Consulting Contracting Engineers)
Schloemann Engineering Corp., Empire Bldg., Pittsburgh, Pa.

ROLLS (Sand and Chilled)
Aetna-Standard Engineering Co., The, Youngstown, O.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Continental Roll & Steel Fdry. Co., E. Chicago, Ind.
Hyde Park Fdry. & Mach. Co., Hyde Park, Pa.
Lewis Foundry & Machine Co., P. O. Box 1586, Pittsburgh, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh, Pa.
National Roll & Foundry Co., The, Avonmore, Pa.
Ohio Steel Fdry. Co., Lima, O.
Pittsburgh Rolls Corp., 41st and Willow Sts., Pittsburgh, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.

ROLLS (Steel and Iron)
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Continental Roll & Steel Fdry. Co., E. Chicago, Ind.
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn. 322 Vulcan St., Buffalo, N. Y.
Hyde Park Fdry. & Mach. Co., Hyde Park, Pa.
Lewis Foundry & Machine Co., P. O. Box 1586, Pittsburgh, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
National Roll & Fdry. Co., The, Avonmore, Pa.
Ohio Steel Fdry. Co., Lima, O.
Pittsburgh Rolls Corp., 41st and Willow Sts., Pittsburgh, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.

ROLLS (Tinning Machines)
American Shear Knife Co., 3rd & Ann Sts., Homestead, Pa.

ROOFING AND SIDING (Corrugated and Plain)
American Rolling Mill Co., The, Middletown, O.
Andrews Steel Co., The, Newport, Ky.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Sons, Inc., 16th and Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

ROOFING (Plastic and Liquid)
Koppers Co., Tar & Chemical Div., 100 Koppers Bldg., Pittsburgh, Pa.

RUBBER GOODS (Mechanical)
Goodyear Tire & Rubber Co., Akron, O.
United States Rubber Co., 1790 Broadway, New York City.

RUST PREVENTIVES
American Chemical Paint Co., Ambler, Pa.
American Lanolin Corp., Railroad St., Lawrence, Mass.
Dearborn Chemical Co., 310 S. Michigan Ave., Chicago, Ill.
Houghton, E. F., & Co., 240 W. Somerset St., Philadelphia, Pa.
Koppers Co., Tar & Chemical Div., 100 Koppers Bldg., Pittsburgh, Pa.

RUST PROOFING PROCESS
American Chemical Paint Co., Ambler, Pa.
Enterprise Galvanizing Co., 2525 E. Cumberland St., Philadelphia, Pa.
Koppers Co., Tar & Chemical Div., 100 Koppers Bldg., Pittsburgh, Pa.

SAFE ENDS (Boiler Tube)
National Tube Co., Frick Bldg., Pittsburgh, Pa.

SAFETY DEVICES (Electric)
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.

SALT TABLETS
Morton Salt Co., 208 W. Washington St., Chicago, Ill.

SAND CONDITIONING AND PREPARING MACHINERY
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

SAWS (Hot and Cold)
Morgan Engineering Co., The, Alliance, O.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.

SAWS (Inserted Tooth, Cold)
Simonds Saw & Steel Co., Fitchburg, Mass.

SAWS (Metal Cutting)
Simonds Saw & Steel Co., Fitchburg, Mass.
Youngstown Sheet & Tube Co., Youngstown, O.

SCAFFOLDING (Tubular)
Dravo Corp. (Macninery Div.), 300 Penn Ave., Pittsburgh, Pa.

SCALES
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
Fairbanks, Morse & Co., Dept. 96, 600 So. Wabash Ave., Chicago, Ill.
Kron Co., The, Bridgeport, Conn.

SCALES (Dial)
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
Fairbanks, Morse & Co., 600 So. Wabash Ave., Chicago, Ill.
Kron Co., The, Bridgeport, Conn.

SCALES (Monorail)
American MonoRail Co., The, 13102 Athens Ave., Cleveland, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1125 Depot St., Wickliffe, O.
Kron Co., The, Bridgeport, Conn.
Shepard-Niles Crane & Hoist Corp., Montour Falls, N. Y.

SCALING TOOLS (Pneumatic)
Ingersoll-Rand Co., 11 Broadway, New York City.

SCRAP BALING PRESSES—See BALING PRESSES

SCREENS AND SIEVES
Chicago Perforating Co., 2443 W. 24th Pl. Chicago, Ill.
Erdle Perforating Co., 171 York St., Rochester, N. Y.
Harrington & King Perforating Co., 5634 Fillmore St., Chicago, Ill.
Koppers Co., Engineering & Construction Div., 100 Koppers Bldg., Pittsburgh, Pa.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York City.

SCREW EXTRACTORS
Greenfield Tap & Die Corp., Greenfield, Mass.

SCREW MACHINE PRODUCTS
Barnes, Wallace, Co., The, Div. Associated Spring Corp., Bristol, Conn.
Hindley Mfg. Co., Valley Falls, R. I.
National Acme Co., The E. 131st St. & Coit Rd., Cleveland, O.
Progressive Mfg. Co., Torrington, Conn.
Titan Metal Mfg. Co., Bellefonte, Pa.

SCREW MACHINES (Automatic, Single and Multiple Spindle)
Brown & Sharpe Mfg. Co., Providence, R. I.
National Acme Co., The, E. 131st St. & Coit Rd., Cleveland, O.

SCREW PLATES
Greenfield Tap & Die Corp., Greenfield, Mass.

SCREW STOCK—See STEEL (Screw Stock)

SCREWS
Cleveland Cap Screw Co., 2934 E. 79th St., Cleveland, O.
Parker-Kalon Corp., 200 Varick St., New York City.
Progressive Mfg. Co., Torrington, Conn.

SCREWS (Cap, Set, Safety-Set)
Cleveland Cap Screw Co., 2934 E. 79th St., Cleveland, O.
National Acme Co., The, E. 131st St. & Coit Rd., Cleveland, O.
Standard Pressed Steel Co., Box 579, Jenkintown, Pa.

SCREWS (Cold Headed)
Cleveland Cap Screw Co., 2934 E. 79th St., Cleveland, O.

SCREWS (Conveyor)
Lee Spring Co. Inc., 30 Main St., Brooklyn, N. Y.

SCREWS (Drive)
Parker-Kalon Corp., 200 Varick St., New York City.

SCREWS (Hardened Self-Tapping)
Parker-Kalon Corp., 200 Varick St., New York City.

SCREWS (Machine)
Progressive Mfg. Co., Torrington, Conn.

SCREWS (Machine, Recessed Head)
American Screw Co., Providence, R. I.
Chandler Products Co., Euclid, O.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corp., New Britain, Conn.

SCREWS (Machine, Recessed Head)—Con.
Lamson & Sessions Co., The, Cleveland, O.
National Screw & Mfg. Co., Cleveland, O.
Parker-Kalon Corp., New York City.
Pheoll Mfg. Co., Chicago, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Mfg. Co., Waterbury, Conn.

SCREWS (Sheet Metal, Recessed Head)
American Screw Co., Providence, R. I.
Chandler Products Co., Euclid, O.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corp., New Britain, Conn.
Lamson & Sessions Co., The, Cleveland, O.
National Screw & Mfg. Co., Cleveland, O.
Parker-Kalon Corp., New York City.
Pheoll Mfg. Co., Chicago, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

SCREWS (Socket, Cold Forged)
Parker-Kalon Corp., 200 Varick St., New York City.

SCREWS (Socket, Head, Cap)
Standard Pressed Steel Co., Box 579, Jenkintown, Pa.

SCREWS (Thumb)
Parker-Kalon Corp., 200 Varick St., New York City.

SCREWS (Wood, Recessed Head)
American Screw Co., Providence, R. I.
Chandler Products Co., Euclid, O.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corp., New Britain, Conn.
Lamson & Sessions Co., The, Cleveland, O.
National Screw & Mfg. Co., Cleveland, O.
Pheoll Mfg. Co., Chicago, Ill.

SEAMLESS STEEL TUBING—See TUBES

SEPARATORS (Magnetic)
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.
Ohio Electric Mfg. Co., The, 5906 Maurice Ave., Cleveland, O.

SHAFT HANGERS—See HANGERS (Shaft)

SHAFTING
Bliss & Laughlin, Inc., Harvey, Ill.
Fitzsimons Co., The, 1623 Wilson Ave., Youngstown, O.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
LaSalle Steel Co., P. O. Box 6800-A, Chicago, Ill.
Moltrup Steel Products Co., Beaver Falls, Pa.
Monarch Steel Co., McCarty and Sand Sts., Indianapolis, Ind.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Standard Steel Works Co., Paschall P. O., Philadelphia, Pa.
Union Drawn Steel Co., Massillon, O.
Wisconsin Steel Co., 180 No. Michigan Ave., Chicago, Ill.
Wyckoff Drawn Steel Co., First National Bank Bldg., Pittsburgh, Pa.

SHAPERS
Cincinnati Shaper Co., Garrard and Elam Sts., Cincinnati, O.

SHAPES (Brass, Bronze, Nickel Silver)
Titan Metal Mfg. Co., Bellefonte, Pa.

SHAPES (Steel)—See STEEL (Structural)

SHAPES, SPECIAL (Steel)
Bliss & Laughlin, Inc., Harvey, Ill.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Fitzsimons Co., The, 1623 Wilson Ave., Youngstown, O.
Fort Pitt Spring Co., P. O. Box 1377, Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Monarch Steel Co., McCarty and Sand Sts., Indianapolis, Ind.
Pressed Steel Tank Co., Milwaukee, Wis.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Union Drawn Steel Co., Massillon, O.
Wisconsin Steel Co., 180 No. Michigan Ave., Chicago, Ill.
Wyckoff Drawn Steel Co., First National Bank Bldg., Pittsburgh, Pa.

SHEAR BLADES
American Shear Knife Co., 3rd and Ann Sts., Homestead, Pa.
Cleveland Punch & Shear Works, The, 3917 St. Clair Ave., Cleveland, O.
Heppenstall Co., 47th & Hatfield Sts., Pittsburgh, Pa.

SHEARS
Aetna-Standard Engineering Co., The, Youngstown, O.
Beatty Machine & Mfg. Co., Hammond, Ind.
Cincinnati Shaper Co., Garrard and Elam Sts., Cincinnati, O.
Cleveland Punch & Shear Works, The, 3917 St. Clair Ave., Cleveland, O.
Continental Roll & Steel Fdry. Co., E. Chicago, Ind.
Hallden Machine Co., The, Thomaston, Conn.
Hyde Park Fdry. & Mach. Co., Hyde Park, Pa.
Lewis Fdry. & Mach. Co., P. O. Box 1586, Pittsburgh, Pa.
Morgan Engineering Co., The, Alliance, O.
Niagara Machine & Tool Works, 637 Northland Ave., Buffalo, N. Y.
Thomas Machine Mfg. Co., Pittsburgh, Pa.
United Engineering & Fdry. Co., First National Bank Bldg. Pittsburgh, Pa.

SHEET BARS
Andrews Steel Co., The, Newport, Ky.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Wisconsin Steel Co., 180 No. Michigan Ave., Chicago, Ill.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEET LIFTERS AND CARRIERS
American MonoRail Co., The, 13102 Athens Ave., Cleveland, O.
Hyde Park Fdry. & Mach. Co., Hyde Park, Pa.
J-B Engineering Sales Co., 1743 Orange St., New Haven, Conn.

SHEET METAL PRODUCTS—See STAMPINGS

SHEET METAL WORKERS MACHINES
Cincinnati Shaper Co., Elam and Garrard Sts., Cincinnati, O.
Excelsior Tool & Machine Co., Ridge and Jefferson Aves., East St. Louis, Ill.
Niagara Machine & Tool Works 637 Northland Ave., Buffalo, N. Y.

SHEET STEEL ASSEMBLIES (Fabricated)
Budd, Edw. G., Mfg. Co., 25th St. & Huntington Park Ave., Philadelphia, Pa.

SHEET STEEL PILING (New and Used)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Foster, L. B., Co., Inc., P. O. Box 1647, Pittsburgh, Pa.

SHEETS (Acid Resisting)
International Nickel Co., Inc., The, 67 Wall St., New York City.

SHEETS (Black)
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Andrews Steel Co., The, Newport, Ky.
Granite City Steel Co., Granite City, Ill.
Great Lakes Steel Corp., Ecorse, Detroit, Mich.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jessop Steel Co., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.

SHEETS (Brass, Bronze, Copper, Nickel Silver, Silicon-Bronze)
American Brass Co., The, 25 Broadway, New York City.
Bridgeport Brass Co., Bridgeport, Conn.

SHEETS (Corrugated)
American Rolling Mill Co., The, Middletown, O.
Andrews Steel Co., The, Newport, Ky.
Apollo Steel Co., Oliver Bldg., Pittsburgh, Pa,
Bethlehem Steel Co., Bethlehem, Pa
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST. Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS (Deep Drawing and Stamping)
Alan Wood Steel Co., Conshohocken, Pa.
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
American Rolling Mill Co., Middletown, O.
Andrews Steel Co., The, Newport, Ky.
Apollo Steel Co., Oliver Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Granite City Steel Co., Granite City, Ill.
Great Lakes Steel Corp., Ecorse, Detroit, Mich.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS (Electrical)
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
American Rolling Mill Co., The, Middletown, O.
Andrews Steel Co., The, Newport, Ky.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS (Galvanized)
American Rolling Mill Co., The, Middletown, O.
Andrews Steel Co., The, Newport, Ky.
Apollo Steel Co., Oliver Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS (Hot Rolled and Hot Rolled Annealed)
Alan Wood Steel Co., Conshohocken, Pa.
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
American Rolling Mill Co., Middletown, O.
Andrews Steel Co., The, Newport, Ky.
Apollo Steel Co., Oliver Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Granite City Steel Co., Granite City, Ill.
Great Lakes Steel Corp., Ecorse, Detroit, Mich.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS (Long Terne)
Andrews Steel Co., The, Newport, Ky.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS (Perforated)
Harrington & King Perforating Co., 5634 Fillmore St., Chicago, Ill.

SHEETS (Reinforced)
Erdle Perforating Co., 171 York St., Rochester, N. Y.

SHEETS (Roofing)—See ROOFING AND SIDING

SHEETS (Stainless)
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
American Rolling Mill Co., The, Middletown, O.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Jessop Steel Co., Washington, Pa.
Republic Steel Corp., Massillon, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.

SHEETS (Stainless Clad)
Granite City Steel Co., Granite City, Ill.

SHEETS (Tin)—See TIN PLATE

SHEETS (Tin Mill Black)
Andrews Steel Co., The, Newport, Ky.
Bethlehem Steel Co., Bethlehem, Pa.

WHERE-TO-BUY

SHEETS (Tin Mill Black)—Con.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.

SHEETS—HIGH FINISH (Automobile, Metal Furniture, Enameling)
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
American Rolling Mill Co., The, Middletown, O.
Andrews Steel Co., The, Newport, Ky.
Apollo Steel Co., Oliver Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Great Lakes Steel Corp., Ecorse, Detroit, Mich.
Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SIEVES—See SCREENS AND SIEVES

SILICO-MANGANESE
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.
Ohio Ferro-Alloys Corp., Citizens Bldg., Canton, O.
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia, Pa.
Vanadium Corp. of America, 420 Lexington Ave., New York City.

SILICON METAL AND ALLOYS
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.

SKELP (Steel)
Alan Wood Steel Co., Conshohocken, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Wisconsin Steel Co., 180 No. Michigan Ave., Chicago, Ill.

SLAG GRANULATING MACHINES (Blast Furnace and Open Hearth)
Brosius, Edgar E., Inc., Sharpsburg, Pa.

SMALL TOOLS
Brown & Sharpe Mfg. Co., Providence, R. I.
Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland, O.

SOAKING PITS
Criswell, James, Co., Keenan Bldg., Pittsburgh, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo, O.

SOLVENT (Degreasing)
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia, Pa.

SPACING TABLES
Thomas Machine Mfg. Co., Pittsburgh, Pa.

SPECIAL MACHINERY—See MACHINERY (Special)

SPEED REDUCERS
Cleveland Worm & Gear Co. 3280 E. 80th St., Cleveland, O.
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn. 322 Vulcan St., Buffalo, N. Y.
Foote Bros. Gear & Machine Corp., 5311 S. Western Ave., Chicago, Ill.
Grant Gear Works, 2nd and B Sts., Boston, Mass.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland, O.
James, D. O., Mfg. Co., 1116 W. Monroe St., Chicago, Ill.
Jones, W. A., Fdry. & Mach. Co., 4437 W. Roosevelt Rd., Chicago, Ill.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis, Ind.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit, Mich.
New Departure Div., General Motors Corp., Bristol, Conn.

SPIEGELEISEN
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.
New Jersey Zinc Co., 160 Front St., New York City.
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia, Pa.

SPIKES (Screw)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Republic Steel Corp., Dept. ST, Cleveland, O.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Youngstown Sheet & Tube Co., Youngstown, O.

SPLICE BARS (Rail)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.

SPRINGS (*Also Stainless)
*American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Barnes, Wallace, Co., The, Div. Associated Spring Corp., Bristol, Conn.
Duer Spring & Mfg. Co., Pittsburgh, Pa.
Fort Pitt Spring Co., P. O. Box 1377, Pittsburgh, Pa.
Hubbard, M. D., Spring Co., 613 Central Ave., Pontiac, Mich.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
Raymond Mfg. Co., Div. Associated Spring Corp., Corry, Pa.
Standard Steel Works Co., Paschall P. O., Philadelphia, Pa.
Washburn Wire Co., 118th St. & Harlem River, New York City.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York City.

SPRINGS (Alloy)
Fort Pitt Spring Co., P. O. Box 1377, Pittsburgh, Pa.

SPRINGS (Coil and Elliptic)
Fort Pitt Spring Co., P. O. Box 1377, Pittsburgh, Pa.

SPRINGS (Oil Tempered—Flat)
Davis Brake Beam Co., Laurel Ave., & P. R. R., Johnstown, Pa.

SPROCKETS
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.

SPRUE CUTTERS
Shuster, F. B., Co., The, New Haven, Conn.

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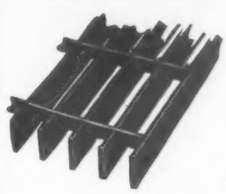
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STACKS (Steel)—See BRIDGES, ETC.

STAINLESS STEEL—See BARS, SHEETS, STRIP, PLATES, ETC.

STAMPINGS
American Tube & Stamping Plant, (Stanley Wks.), Bridgeport, Conn.
Barnes, Wallace, Co., The, Div. Associated Spring Corp., Bristol, Conn.
Budd, Edw. G., Mfg. Co., 25th St. & Huntington Park Ave., Philadelphia, Pa.
Crosby Co., The, 183 Pratt St., Buffalo, N. Y.
Davis Brake Beam Co., Laurel Ave., & P. R. R., Johnstown, Pa.
Erdle Perforating Co., 171 York St., Rochester, N. Y.
Hubbard, M. D., Spring Co., 613 Central Ave., Pontiac, Mich.
Pressed Steel Tank Co., 1461 So. 66th St., Milwaukee, Wis.
Raymond Mfg. Co., Div. Associated Spring Corp., Corry, Pa.
Stanley Works, The, New Britain, Conn.
Toledo Stamping & Mfg. Co., 90 Fearing Blvd., Toledo, O.
Whitehead Stamping Co., 1667 W. Lafayette Blvd., Detroit, Mich.

STAPLES (Wire)
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Columbia Steel Co., San Francisco, Calif.
Keystone Steel & Wire Co., Peoria, Ill.
Republic Steel Corp., Dept. ST, Cleveland, O.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Wickwire Brothers, 189 Main St., Cortland, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

STARTERS (Electric Motor)
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.

STEEL (Alloy)
Alan Wood Steel Co., Conshohocken, Pa.
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Bethehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Firth-Sterling Steel Co., McKeesport, Pa.
Fitzsimons Co., The, 1623 Wilson Ave., Youngstown, O.
Heppenstall Co., 47th & Hatfield Sts., Pittsburgh, Pa.
Jessop Steel Co., Washington, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Simonds Saw & Mfg. Co., Fitchburg, Mass.
Stanley Works, The, New Britain, Conn. Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Timken Steel & Tube Co., Canton, O.
Washburn Wire Co., Phillipsdale, R. I.
Wisconsin Steel Co., 180 No. Michigan Ave., Chicago, Ill.

STEEL (Alloy, Cold Finished)
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Bliss & Laughlin, Inc., Harvey, Ill.
Firth-Sterling Steel Co., McKeesport, Pa.
LaSalle Steel Co., P. O. Box 6800-A, Chicago, Ill.
Moltrup Steel Products Co., Beaver Falls, Pa.
Union Drawn Steel Co., Massillon, O.
Wyckoff Drawn Steel Co., First National Bank Bldg., Pittsburgh, Pa.
Wisconsin Steel Co., 180 No. Michigan Ave., Chicago, Ill.

STEEL (Clad—Corrosion Resisting) (*Also Stainless)
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
*Granite City Steel Co., Granite City, Ill.
Jessop Steel Co., Washington, Pa.
Superior Steel Corp., Carnegie, Pa.

STEEL (Cold Drawn)
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Bliss & Laughlin, Inc., Harvey, Ill.
Firth-Sterling Steel Co., McKeesport, Pa.
Fitzsimons Co., The, 1623 Wilson Ave., Youngstown, O.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Kidd Drawn Steel Co., Aliquippa, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Monarch Steel Co., McCarty and Sand Sts., Indianapolis, Ind.
Union Drawn Steel Co., Massillon, O.
Wisconsin Steel Co., 180 No. Michigan Ave., Chicago, Ill.
Wyckoff Drawn Steel Co., First National Bank Bldg., Pittsburgh, Pa.

STEEL (Cold Finished)
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Firth-Sterling Steel Co., McKeesport, Pa.
Fitzsimons Co., The, 1623 Wilson Ave., Youngstown, O.
LaSalle Steel Co., P. O. Box 6800-A, Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Monarch Steel Co., McCarty and Sand Sts., Indianapolis, Ind.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Union Drawn Steel Co., Massillon, O.
Wisconsin Steel Co., 180 No. Michigan Ave., Chicago, Ill.
Wyckoff Drawn Steel Co., First National Bank Bldg., Pittsburgh, Pa.

STEEL (Corrosion Resisting)
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
American Rolling Mill Co., The, Middletown, O.
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Andrews Steel Co., The, Newport, Ky.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Firth-Sterling Steel Co., McKeesport, Pa.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jessop Steel Co., Washington, Pa.
Jessop, Wm., & Sons, Inc., 121 Varick St., New York City.
Midvale Co., The, Nicetown, Philadelphia, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Stanley Works, The, New Britain, Conn. Bridgeport, Conn.
Superior Steel Corp., Carnegie, Pa.
Timken Steel & Tube Co., Canton, O.

STEEL (Die)
Allegheny Ludlum Steel Corp., Oliver Bldg., Piftsburgh, Pa.
Jessop, Wm., & Sons, Inc., 121 Varick St., New York City.

STEEL (Drill)
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.

STEEL (Electric)
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Firth-Sterling Steel Co., McKeesport, Pa.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jessop, Wm., & Sons, Inc., 121 Varick St., New York City.
Latrobe Electric Steel Co., Latrobe, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Timken Steel & Tube Co., Canton, O.

STEEL (High Speed)
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Jessop Steel Co., Washington, Pa.
Jessop, Wm., & Sons Co., 121 Varick St., New York City.
Latrobe Electric Steel Co., Latrobe, Pa.

STEEL (High Tensile, Low Alloy)
Alan Wood Steel Co., Conshohocken, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Great Lakes Steel Corp., Ecorse, Detroit, Mich.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Youngstown Sheet & Tube Co., The, Youngstown, O.

STEEL (Nitriding)
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.

STEEL (Rustless)—See STEEL (Corrosion Resisting)

STEEL (Screw Stock)
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
LaSalle Steel Co., P. O. Box 6800-A, Chicago, Ill.
Moltrup Steel Products Co., Beaver Falls, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Union Drawn Steel Co., Massillon, O.
Wisconsin Steel Co., 180 No. Michigan Ave., Chicago, Ill.
Wyckoff Drawn Steel Co., First National Bank Bldg., Pittsburgh, Pa.
Youngstown Sheet & Tube Co., The, Youngstown, O.

STEEL (Spring)
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Fort Pitt Spring Co., P. O. Box 1377, Pittsburgh, Pa.
Washburn Wire Co., 118th St. & Harlem River, New York City.

STEEL (Stainless)—See STEEL (Corrosion Resisting)

STEEL (Strip, Copper Coated)
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Stanley Works, The, New Britain, Conn. Bridgeport, Conn.
Thomas Steel Co., Warren, O.

STEEL (Strip, Hot and Cold Rolled) (*Also Stainless)
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
*American Rolling Mill Co., The, Middletown, O.
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
American Tube & Stamping Plant, (Stanley Wks.), Bridgeport, Conn.
Andrews Steel Co., The, Newport, Ky.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Enterprise Galvanizing Co., 2525 E. Cumberland St., Philadelphia, Pa.
*Firth-Sterling Steel Co., McKeesport, Pa.
Great Lakes Steel Corp., Ecorse, Detroit, Mich.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jessop, Wm., & Sons, Inc., 121 Varick St., New York City.
Jessop Steel Co., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Republic Steel Corp., Dept. ST, Cleveland, O.
*Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
*Stanley Works, The, New Britain, Conn. Bridgeport, Conn.
Superior Steel Corp., Carnegie, Pa.
Tennessee Coal, Iron & Railroad Co. Brown Marx Bldg., Birmingham, Ala.
Thomas Steel Co., Warren, O.
Washburn Wire Co., 118th St. & Harlem River, New York City.
Weirton Steel Co., Weirton, W. Va
Wickwire Spencer Steel Co., 500 Fifth Ave., New York City.
Wisconsin Steel Co., 180 No. Michigan Ave., Chicago, Ill.

STEEL (Strip, Tin Coated)
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Thomas Steel Co., The, Warren, O
Washburn Wire Co., 118th St. & Harlem River, New York City.

STEEL (Strip, Zinc Coated)
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Thomas Steel Co., Warren, O.
Washburn Wire Co., 118th St. & Harlem River, New York City.

STEEL (Structural) (*Also Stainless)
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
Belmont Iron Works, 22nd St. and Washington Ave., Philadelphia, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Enterprise Galvanizing Co., 2525 E. Cumberland St., Philadelphia, Pa.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
*Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Wisconsin Steel Co., 180 No. Michigan Ave., Chicago, Ill.
Youngstown Sheet & Tube Co., The, Youngstown, O.

STEEL (Tool)
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Darwin & Milner, Inc., 1260 W. 4th St., Cleveland, O.

STEEL (Tool)—Con.
Firth-Sterling Steel Co., McKeesport, Pa.
Jessop Steel Co., Washington, Pa.
Jessop, Wm., & Sons Co., 121 Varick St., New York City.
Kidd Drawn Steel Co., Aliquippa, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.

STEEL BUILDINGS—See BRIDGES, BUILDINGS, ETC.

STEEL DOORS & SHUTTERS—See DOORS & SHUTTERS

STEEL FABRICATORS—See BRIDGES, BUILDINGS, ETC.

STEEL FLOATING AND TERMINAL EQUIPMENT
Dravo Corp. (Engin'r'g Works Div.), Neville Island, Pittsburgh, Pa.

STEEL PLATE CONSTRUCTION
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
Bartlett-Hayward Div., The Koppers Co., Baltimore, Md.
Belmont Iron Works, 22nd St., and Washington Ave., Philadelphia, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Brown Instrument Div. of Minneapolis Honeywell Regulator Co., 4462 Wayne Ave., Philadelphia, Pa.
Federal Shipbuilding & Dry Dock Co., Kearney, N. J.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Western Gas Div., The Koppers Co., Fort Wayne, Ind.

STELLITE
Haynes Stellite Co., Harrison and Lindsay Sts., Kokomo, Ind.

STOKERS
Babcock & Wilcox Co., The, 19 Rector St., New York City.

STOPPERS (Cinder Notch)
Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh, Pa
Brosius, Edgar E., Inc., Sharpsburg, Pa.

STORAGE BATTERIES—See BATTERIES (Storage)

STRAIGHTENING MACHINERY
Aetna-Standard Engineering Co., The, Youngstown, O.
Cleveland Punch & Shear Works, The, 3917 St. Clair Ave., Cleveland, O.
Lewis Foundry & Machine Co., P. O. Box 1586, Pittsburgh, Pa.
Lewis Machine Co., 3438 E. 76th St., Cleveland, O.
Logeman Brothers Co., 3126 Burleigh St., Milwaukee, Wis.
Medart Co., The, 3520 de Kalb St., St. Louis, Mo.
Shuster, F. B., Co., The, New Haven, Conn.
Sutton Engineering Co., Park Bldg., Pittsburgh, Pa.
Voss, Edward W., 2882 W. Liberty Ave., Pittsburgh, Pa.

SULPHURIC ACID
Cleveland-Cliffs Iron Co., Union Commerce Bldg., Cleveland, O.
New Jersey Zinc Co., 160 Front St., New York City.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia, Pa.

SWITCHES (Electric)
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.
General Electric Co., Schenectady, N. Y.
General Electric Co., Lamp Dept., Nela Park, Cleveland, O.

TACHOMETERS
Brown Instrument Div. of Minneapolis Honeywell Regulator Co., 4462 Wayne Ave., Philadelphia, Pa.
Foxboro Co., The, 118 Neponset Ave., Foxboro, Mass.

TANKS (Pickling)
American Hard Rubber Co., 11 Mercer St., New York City.
Goodyear Tire & Rubber Co., Akron, O.
United States Rubber Co., 1790 Broadway, New York City.

TANKS (Quenching, Automatic)
American Gas Furnace Co., Elizabeth, N. J.

TANKS (Storage, Pressure, Riveted, Welded)
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
Bartlett-Hayward Div., The Koppers Co., Baltimore, Md.
Bethlehem Steel Co., Bethlehem, Pa.
Pressed Steel Tank Co., 1461 So. 66th St., Milwaukee, Wis.
Western Gas Div., The Koppers Co., Fort Wayne, Ind.

TANKS—WOOD OR STEEL (Rubber or Lead Lined)
American Hard Rubber Co., 11 Mercer St., New York City.
Dietzel Lead Burning Co., Coraopolis, Pa.
Goodyear Tire & Rubber Co., Akron, O.
United States Rubber Co., 1790 Broadway, New York City.

TAPS AND DIES
Greenfield Tap & Die Corp., Greenfield, Mass.
Landis Machine Co., Inc., Waynesboro, Pa.
National Acme Co., The, E. 131st St. & Coit Rd., Cleveland, O.

TERNE PLATE—See TIN PLATE

THERMOMETERS
Brown Isntrument Div. of Minneapolis Honeywell Regulator Co., 4462 Wayne Ave., Philadelphia, Pa.
Foxboro Co., The, 118 Neponset Ave., Foxboro, Mass.
Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.

THREAD CUTTING TOOLS
Landis Machine Co., Inc., Waynesboro, Pa.

TIE PLATES
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Republic Steel Corp., Dept. ST, Cleveland, O.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.

TIN PLATE
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., The, Youngstown, O.

TIN PLATE MACHINERY
Aetna-Standard Engineering Co., The, Youngstown, O.
Kemp, C. M., Mfg. Co., 405 E. Oliver St., Baltimore, Md.
Wean Engineering Co., Warren, O.

TITANIUM
Vanadium Corp. of America, 420 Lexington Ave., New York City.

TOOL BITS (High Speed)
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Haynes Stellite Co., Harrison and Lindsay Sts., Kokomo, Ind.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit, Mich.

TOOLS (Pneumatic)
Cleveland Punch & Shear Works, 3917 St. Clair Ave., Cleveland, O.
Ingersoll-Rand Co., 11 Broadway, New York City.

TOOLS (Precision, Lathe, Metal Cutting, etc.)
McKenna Metals Co., 200 Lloyd Ave., Latrobe, Pa.

TOOLS (Tipped, Carbide)
McKenna Metals Co., 200 Lloyd Ave., Latrobe, Pa.

TORCHES AND BURNERS (Acetylene, Blow, Oxy-Acetylene)
Air Reduction Sales Co., 60 E. 42nd St., New York City.
Linde Air Products Co., The, 30 E. 42nd St., New York City.

TORCHES AND BURNERS (Air—Gas)
American Gas Furnace Co., Elizabeth, N. J.

TOWBOATS
Dravo Corp. (Engin'r'g Works Div.), Neville Island, Pittsburgh, Pa.

TOWERS (Transmission)
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.

TOWERS (Tubular Hoisting)
Dravo Corp. (Machinery Div.), 300 Penn Ave., Pittsburgh, Pa.

TRACK ACCESSORIES
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Foster, L. B., Co., Inc., P. O. Box 1647, Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.

TRACK BOLTS
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland, O.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Youngstown Sheet & Tube Co., Youngstown, O.

TRAILERS (Arch-Girder)
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa

TRAMRAILS
American MonoRail Co., The, 13102 Athens Ave., Cleveland, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1125 Depot St., Wickliffe, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa.

TRANSFORMERS
Wagner Electric Corp., 6400 Plymouth Ave., St. Louis, Mo.

TRANSMISSIONS VARIABLE SPEED
Link-Belt Co., 220 S. Belmont Ave., Indianapolis, Ind.

TRAPS (Steam and Radiator)
Johns-Manville Corp., 22 E. 40th St., New York City.

TREADS (Safety)
Alan Wood Steel Co., Conshohocken, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Dravo Corp. (Machinery Div.), 300 Penn Ave., Pittsburgh, Pa.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Tri-Lok Co., 5515 Butler St., Pittsburgh, Pa.

TROLLEYS
American MonoRail Co., The, 13102 Athens Ave., Cleveland, O.
Ford Chain Block Div. American Chain & Cable Co. Inc., 2nd & Diamond Sts., Philadelphia, Pa.
Wright Mfg. Div. of American Chain & Cable Co. Inc., York, Pa.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa

TRUCKS AND TRACTORS (Electric Industrial)
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
Elwell-Parker Electric Co., The, 4501 St. Clair Ave., Cleveland, O.
Towmotor, Inc., 1247 E. 152nd St., Cleveland, O.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa.

TRUCKS AND TRACTORS (Gasoline Industrial)
Clark Tructractor Div., Clark Equipment Co., Battle Creek, Mich.
Elwell-Parker Electric Co., The, 4501 St. Clair Ave., Cleveland, O.
Towmotor, Inc., 1247 E. 152nd St., Cleveland, O.

TRUCKS (Dump-Industrial)
Towmotor, Inc., 1247 E. 152nd St., Cleveland, O.

TRUCKS (Hydraulic Lift)
Towmotor, Inc., 1247 E. 152nd St., Cleveland, O.

TRUCKS (Lift)
Clark Tructractor Div., Clark Equipment Co., Battle Creek, Mich.
Elwell-Parker Electric Co., The, 4501 St. Clair Ave., Cleveland, O.
Towmotor, Inc., 1247 E. 152nd St., Cleveland, O
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa.

TUBE MILL EQUIPMENT
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh, Pa.

TUBE MILL MACHINERY
Aetna-Standard Engineering Co., The, Youngstown, O.

TUBES (Boiler)
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Pittsburgh Steel Co., 1653 Grant Bldg., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Standard Tube Co., The, 14600 Woodward Ave., Detroit, Mich.
Timken Steel & Tube Co., Canton, O.
Youngstown Sheet & Tube Co., The, Youngstown, O.

TUBES (Brass, Bronze, Copper, Nickel Silver)
American Brass Co., The, American Metal Hose Branch, Waterbury, Conn.
Bridgeport Brass Co., Bridgeport, Conn.

TUBING (Alloy Steel) (*Also Stainless)
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
*Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Columbia Steel Co., San Francisco, Calif.
*National Tube Co., Frick Bldg., Pittsburgh, Pa.
Pittsburgh Steel Co., 1653 Grant Bldg., Pittsburgh, Pa.
Timken Steel & Tube Co., Canton, O.

TUBING (Cold Drawn Seamless Steel)
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Columbia Steel Co., San Francisco, Calif.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Pittsburgh Steel Co., 1653 Grant Bldg., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Standard Tube Co., The, 14600 Woodward Ave., Detroit, Mich.
Timken Steel & Tube Co., Canton, O.

TUBING (Copper, Brass, Aluminum)
Bundy Tubing Co., 10951 Hern Ave., Detroit, Mich.
Shenango-Penn Mold Co., Dover, O.

TUBING (Phosphor Bronze)
American Brass Co., The, American Metal Hose Branch, Waterbury, Conn.

TUBING (Seamless Flexible Metal)
American Brass Co., The, American Metal Hose Branch, Waterbury, Conn.

TUBING (Welded Steel)
Bundy Tubing Co., 10951 Hern Ave., Detroit, Mich.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Standard Tube Co., Th. 14600 Woodward Ave., Detroit, Mich.
Youngstown Sheet & Tube Co., The, Youngstown, O.

TUMBLING BARRELS (Coke Testing)
Brosius, Edgar E., Inc., Sharpsburg, Pa.

TUNGSTEN CARBIDE
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
Haynes Stellite Co., Harrison and Lindsay Sts., Kokomo, Ind.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit, Mich.

TUNGSTEN CARBIDE (Tools and Dies)
Firth-Sterling Steel Co., McKeesport, Pa.

TUNGSTEN METAL AND ALLOYS
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.
Vanadium Corp. of America, 420 Lexington Ave., New York City.

TURBINES (Steam)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

TURBO BLOWERS—See BLOWERS

TURNTABLES
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.

TURRET LATHES—See LATHES (Turret)

TWIST DRILLS
Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland, O.
Greenfield Tap & Die Corp., Greenfield, Mass.

VACUUM CLEANERS
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.

VALVES (Blast Furnace)
Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh, Pa.
Brosius, Edgar E., Inc., Sharpsburg, Pa.

VALVES (Brass, Iron and Steel)
Crane Co., 836 S. Michigan Blvd., Chicago, Ill.
Reading-Pratt & Cady Div. of American Steel & Wire Co. Inc., Bridgeport, Conn.

VALVES (Check)
Crane Co., 836 S. Michigan Blvd., Chicago, Ill.
Reading-Pratt & Cady Div. of American Chain & Cable Co. Inc., Bridgeport, Conn.

VALVES (Control—Air and Hydraulic)
Foxboro Co., The, 118 Neponset Ave., Foxboro, Mass.
Hannifin Mfg. Co., 621-631 So. Kolmar Ave., Chicago, Ill.
Hunt, C. B., & Son, Salem, O.
Ross Operating Valve Co., 6474 Epworth Blvd., Detroit, Mich.

VALVES (Electrically Operated)
Foxboro Co., The, 118 Neponset Ave., Foxboro, Mass.
Hunt, C. B., & Son, Salem, O.
Ross Operating Valve Co., 6474 Epworth Blvd., Detroit, Mich.

VALVES (Gas and Air Reversing)
Blaw-Knox Co., Blawnox, Pa.
Wilputte Coke Oven Corp., 570 Lexington Ave., New York City.

VALVES (Gate)
Bartlett-Hayward Div., The Koppers Co., Baltimore, Md.
Crane Co., The, 836 So. Michigan Blvd., Chicago, Ill.
Reading-Pratt & Cady Div. of American Chain & Cable Co. Inc., Bridgepart, Conn.
Western Gas Div., The Koppers Co., Fort Wayne, Ind.

VALVES (Gate—Rubber Lined)
American Hard Rubber Co., 11 Mercer St., New York City.

VALVES (Globe)
Crane Co., 836 S. Michigan Blvd., Chicago, Ill.
Reading-Pratt & Cady Div. of American Chain & Cable Co. Inc., Bridgeport, Conn.

VALVES (Hydraulic)
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Hunt, C. B., & Son, Salem, O.
Hydro-Power Systems, Inc., Mt. Gilead, O.
Wood, R. D., 400 Chestnut St., Philadelphia, Pa.

VALVES (Hydraulic De-Scaling)
Hunt, C. B., & Son, Salem, O.

VALVES (Lead)
Dietzel Lead Burning Co., Coraopolis, Pa.

VALVES (Needle)
Crane Co., 836 S. Michigan Blvd., Chicago, Ill.
Reading-Pratt & Cady Div. of American Chain & Cable Co. Inc., Bridgeport, Conn.

VALVES (Steam and Water)
Reading-Pratt & Cady Div. of American Chain & Cable Co. Inc., Bridgeport, Conn.

VALVES AND FITTINGS—See PIPE FITTINGS

VANADIUM
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.
Vanadium Corp. of America, 420 Lexington Ave., New York City.

VIADUCTS (Steel)—See BRIDGES, ETC.

VISES (Bench)
Hollands Mfg. Co., 342-352 E. 18th St., Erie, Pa.

WALKWAYS—See FLOORING—STEEL

WASHERS (Iron and Steel)
Hubbard, M. D., Spring Co., 613 Central Ave., Pontiac, Mich.
Peoria Malleable Castings Co., Peoria, Ill.

WELDERS (Electric—Arc, Spot, Seam, Flash, Butt, Automatic Projection, Hydromatic, Etc.)
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Lincoln Electric Co., The, Cleveland, O., Dept. Y-647.
Thompson-Gibb Electric Welding Co., Lynn, Mass.
Welding Equipment & Supply Co., 2720 E. Grand Blvd., Detroit, Mich.

WELDING
Bartlett-Hayward Div., The Koppers Co., Baltimore, Md.
Budd, Edw. G., Mfg. Co., 25th St. & Huntington Park Ave., Philadelphia, Pa.
Lincoln Electric Co., The, Cleveland, O., Dept. Y-647.
Western Gas Div., The Koppers Co., Fort Wayne, Ind.

WELDING AND CUTTING APPARATUS AND SUPPLIES (Electric)
General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Lincoln Electric Co., The, Cleveland, O., Dept. Y-647.
Thompson-Gibb Electric Welding Co., Lynn, Mass.
Wilson Welder & Metals Co., 60 E. 42nd St., New York City.
Welding Equipment & Supply Co., 2720 E. Grand Blvd., Detroit, Mich.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

WELDING AND CUTTING APPARATUS AND SUPPLIES (Oxy-Acetylene)
Air Reduction Sales Co., 60 E. 42nd St., New York City.
Linde Air Products Co., The, 30 E. 42nd St., New York City.
Welding Equipment & Supply Co., 2720 E. Grand Blvd., Detroit, Mich.

WELDING RODS (Alloys)
American Agile Corp., 5806 Hough Ave., Cleveland, O.
Champion Rivet Co., The, Harvard Ave. at E. 108th St., Cleveland, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Lincoln Electric Co., The, Cleveland, O., Dept. 20-11.
Maurath, Inc., 7311 Union Ave., Cleveland, O.
Metal & Thermit Corp., 120 Broadway, New York City.
Page Steel & Wire Div. of American Chain & Cable Co. Inc., Monessen, Pa.
Welding Equipment & Supply Co., 2720 E. Grand Blvd., Detroit, Mich.

WELDING RODS (Bronze)
Titan Metal Mfg. Co., Bellefonte, Pa.
Welding Equipment & Supply Co., 2720 E. Grand Blvd., Detroit, Mich.

WELDING RODS OR WIRE
Air Reduction Sales Co., 60 East 42nd St., New York City.
American Agile Corp., 5806 Hough Ave., Cleveland, O.
American Brass Co., The, 25 Broadway, New York City.
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Bridgeport Brass Co., Bridgeport, Conn.
Champion Rivet Co., The, Harvard Ave. at E. 108th St., Cleveland, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Lincoln Electric Co., The, Cleveland, O., Dept. Y-647.
Linde Air Products Co., The, 30 E. 42nd St., New York City.
Maurath, Inc., 7311 Union Ave., Cleveland, O.
Metal & Thermit Corp., 120 Broadway, New York City.
Page Steel & Wire Div. of American Chain & Cable Co. Inc., Monessen, Pa.
Pittsburgh Steel Co., 1653 Grant Bldg., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Seneca Wire & Mfg. Co., Fostoria, O.
Washburn Wire Co., Phillipsdale, R. I.
Welding Equipment & Supply Co., 2720 E. Grand Blvd., Detroit, Mich.
Wickwire Brothers, 189 Main St., Cortland, N. Y.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York City.
Wilson Welder & Metals Co., 60 East 42nd St., New York City.
Youngstown Sheet & Tube Co., The, Youngstown, O.

WHEELS (Car and Locomotive)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Midvale Co., The, Nicetown, Philadelphia, Pa.
Standard Steel Works Co., Paschall P. O., Philadelphia, Pa.

WHEELS (Track)
National-Erie Corp., Erie, Pa.

WINCHES (Electric)
American Engineering Co., 2484 Aramingo Ave., Philadelphia, Pa.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

WIRE (Alloy Steel) (*Also Stainless)
*Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
*American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Columbia Steel Co., San Francisco, Calif.
Firth-Sterling Steel Co., McKeesport, Pa.
*Page Steel & Wire Div. of American Chain & Cable Co. Inc., Monessen, Pa.
*Pittsburgh Steel Co., 1653 Grant Bldg., Pittsburgh, Pa.
*Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Seneca Wire & Mfg. Co., Fostoria, O.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York City.

WIRE (Annealed, Bright, Galvanized)
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Page Steel & Wire Div. of American Chain & Cable Co. Inc., Monessen, Pa.
Pittsburgh Steel Co., 1653 Grant Bldg., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Seneca Wire & Mfg. Co., Fostoria, O.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Wickwire Brothers, 189 Main St., Cortland, N. Y.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York City.
Youngstown Sheet & Tube Co., The, Youngstown, O.

WIRE (Barb)
Bethlehem Steel Co., Bethlehem, Pa.
Pittsburgh Steel Co., 1653 Grant Bldg., Pittsburgh, Pa.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE (Brass)
Titan Metal Mfg. Co., Bellefonte, Pa.

WIRE (Cold Drawn)
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh Steel Co., 1653 Grant Bldg., Pittsburgh, Pa.
Washburn Wire Co., 118th St. & Harlem River, New York City.

WHERE-TO-BUY

WIRE (High Carbon)
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Firth-Sterling Steel Co., McKeesport, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Page Steel & Wire Div. of American Chain & Cable Co. Inc., Monessen, Pa.
Pittsburgh Steel Co., 1653 Grant Bldg., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Seneca Wire & Mfg. Co., Fostoria, O.
Washburn Wire Co., 118th St. and Harlem River, New York City.

WIRE (Music)
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Washburn Wire Co., 118th St. and Harlem River, New York City.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York City.

WIRE (Round, Flat, Square, Special Shapes)
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Columbia Steel Co., Los Angeles, Calif.
Page Steel & Wire Div., of American Chain & Cable Co., Inc., Monessen, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Seneca Wire & Mfg. Co., Fostoria, O.
Tennessee, Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Washburn Wire Co., 118th St. and Harlem River, New York City.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York City.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE (Spring)
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh Steel Co., 1653 Grant Bldg., Pittsburgh, Pa.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Washburn Wire Co., 118th St. & Harlem River, New York City.

WIRE (Stainless)
Firth-Sterling Steel Co., McKeesport, Pa.
Page Steel & Wire Div. of American Chain & Cable Co. Inc., Monessen, Pa.
Pittsburgh Steel Co., 1653 Grant Bldg., Pittsburgh, Pa.

WIRE (Threaded)
Progressive Mfg. Co., Torrington, Conn.

WIRE (Welding)—See WELDING RODS OR WIRE

WIRE AND CABLE (Electric)
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Anaconda Wire & Cable Co., 25 Broadway, New York City.

WIRE BUGGIES
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.

WIRE CLOTH
Cyclone Fence Co., Waukegan, Ill.
Seneca Wire & Mfg. Co., Fostoria, O.
Wickwire Brothers, 189 Main St., Cortland, N. Y.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York City.

WIRE FORMS, SHAPES AND SPECIALTIES
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Columbia Steel Co., San Francisco, Calif.
Firth-Sterling Steel Co., McKeesport, Pa.
Hubbard, M. D., Spring Co., 613 Central Ave., Pontiac, Mich.
Seneca Wire & Mfg. Co., Fostoria, O.

WIRE MILL EQUIPMENT
Lewis Foundry & Machine Co., P. O. Box 1586, Pittsburgh, Pa.
Lewis Machine Co., 3438 E. 76th St., Cleveland, O.
Morgan Construction Co., Worcester, Mass.
Shuster, F. B., Co., The, New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.

WIRE NAILS—See NAILS

WIRE PRODUCTS
(*Also Stainless)
*American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Hubbard, M. D., Spring Co., 613 Central Ave., Pontiac, Mich.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Leschen, A., & Sons Rope Co., 5909 Kennerly Ave., St. Louis, Mo.
Pittsburgh Steel Co., 1653 Grant Bldg., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Seneca Wire & Mfg. Co., Fostoria, O.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Washburn Wire Co., 118th St. and Harlem River, New York City.
Wickwire Brothers, 189 Main St., Cortland, N. Y.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York City.
Youngstown Sheet & Tube Co., The, Youngstown, O.

WIRE ROPE AND FITTINGS
(*Also Stainless)
American Cable Div. of American Chain & Cable Co. Inc., Wilkes-Barre, Pa.
*American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Hazard Wire Rope Div. of American Chain & Cable Co. Inc., Wilkes-Barre, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Leschen, A., & Sons Rope Co., 5909 Kennerly Ave., St. Louis, Mo.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York City.

WIRE ROPE SLINGS
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Leschen, A., & Sons Rope Co., 5909 Kennerly Ave., St. Louis, Mo.

WIRE STRAIGHTENING AND CUTTING MACHINERY
Lewis Foundry & Machine Co., P. O. Box 1586, Pittsburgh, Pa.
Lewis Machine Co., 3438 E. 76th St., Cleveland, O.
Shuster, F. B., Co., The, New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.

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High Costs Cut Earnings

To the Editor:

I have read with interest an article entitled *Will the Steel Rate Hold?*

The writer of the article discusses one reason why present capacity operating rates in the steel industry do not excite more enthusiasm. Another reason is not difficult to discover. It is to be found in existing price levels for steel products, which have not been advanced, although costs have mounted rapidly within the last few months.

It is true that the currently increased volume of steel production offsets the higher costs to some extent and various companies have had some gains in earnings. For others, however, the handicap has proved too difficult to overcome.

Recently in Washington before the temporary national economic committee, important executives of the steel industry testified that the published prices for steel are one thing and the realized prices quite another. They pointed out that severe competition in the industry frequently leads to drastic concessions. There was such a wave of price cutting earlier this year and the result was that the order books of many companies, and particularly those serving the large quantity consumers of steel, were filled up with low priced unprofitable business.

That was the situation at the outbreak of the war in Europe, which was followed by stiff advances for many kinds of raw materials entering into the manufacture of steel. Scrap today is $6 a ton higher than it was in August. Manganese is up $30 a ton. Coal is up 60 cents to $1 a ton. Tin is up $120 a ton, and so on down the line. Meanwhile wage rates remain at the highest levels in history of the industry.

The steel industry has had 10 long years of depression and poor earnings except for the temporary rise in 1937. The industry has spent vast sums in modernizing its plants and keeping its facilities in condition to meet any emergency. It is desperately in need now of price levels which will enable it to make up for some of the losses of past years and to establish a buffer for future poor years. However, the industry is under severe pressure to make no price advances and the level for first quarter business offers no better outlook.

In view of all these facts, it is not at all strange that the high operating rate prevailing in the industry has not created any high degree of optimism for the future of the industry or for its earnings possibilities.

E. J. KULAS

President,
Otis Steel Co.,
Cleveland

Tin Can Waste Problem

To the Editor:

Report by the American consulate in Milan, Italy, that tin is being reclaimed from used tin cans to provide a supply in addition to such tonnage as can be imported, (STEEL Dec. 4, p. 34) reveals what can be done by a totalitarian government.

Reclaiming tin from scrap tin plate is being done successfully in this country and others, the process imposing no particular difficulties. Material from which the tin is recovered is largely scrap from new tin plate, produced in fabrication of cans and other products.

Collection of used cans, under conditions in this country, is too expensive to make them available in sufficient quantities to give a profit.

Perhaps someday a genius will arise with solution of this problem, devising a method for segregation of tin cans from rubbish collections and starting a flow back to the source.

With the tremendous use of tin containers for almost everything the annual loss of tin runs to a high figure, well worth saving if the problem of collection could be mastered. Without the pressure of economic conditions imposed in Italy and perhaps in the war-bound countries, it seems improbable a solution will be forthcoming and the waste is likely to continue.

CANNER

Chicago

Is This a World's Record?

To the Editor:

As an item of news which may be interesting enough for publication, I submit to you the following:

On the night turn of Nov. 1, 1939, we produced on our buttweld furnace what we believe to be a world's record production on ½-inch pipe. Operating strictly for eight hours, without any overtime, either before or after the turn, we produced 10,087 pieces of ½-inch buttweld pipe in 20-foot lengths, for an average of 1260 ⅞ pieces per hour.

Out of this production there were 16 cobbles and 24 rejects.

I have made a very careful check of the industry and would invite any information indicating that this is not what we believe it to be, that is, a world's record.

D. V. SAWHILL

President,
Mercer Tube & Mfg. Co.,
Sharon, Pa.

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